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BY CRIGHTON BRAMWELL, M.A. Camb., M.D. Manch., F.R.C.P. Lond.

ASSISTANT PHYSICIAN TO THE MANCHESTER ROYAL INFIRMARY

FOR the purpose of this address I will take recent advances to mean advances made during the past 20 years. If the teaching of cardiology to-day be compared with that of the pre-war period, attention is arrested by certain striking differences, not only in diagnostic and therapeutic technique, but in general outlook. Before attempting to depict our conception of heart disease to-day, let me refer briefly to certain points in connexion with pathology, diagnosis, and treatment.

Pathology

ANGINA PECTORIS AND MYOCARDIAL INFARCTION

When I was a student, the pathogeny of angina was still a matter of dispute. There were then three main schools of thought. The first held that angina was due to disease of the coronary arteries; the second, which claimed many distinguished exponents, including Clifford Allbutt in this country, Vaquez in France, and Wenckebach in Austria, believed that it was due to disease not of the heart but of the aorta; while a third hypothesis was that put forward by Mackenzie, who maintained that angina was due to exhaustion of the heart muscle. To-day it is generally agreed that the essential factor in all cases of angina is myocardial ischæmia. An insufficient supply of oxygen to the heart muscle may be the result of narrowing of the coronary arteries. This may be due to atheromatous changes in the course of the vessel, or to syphilitic aortitis at its mouth. Myocardial ischæmia may result from coronary spasm, or from low blood pressure in the coronary system, the sequel of free aortic regurgitation. Lastly it may be associated with a deficient oxygen-carrying capacity of the blood itself in patients with profound anæmia.

This conception of myocardial ischæmia as the basis of anginal pain arose out of the recognition of coronary occlusion as a clinical entity distinct from angina of effort. Twenty years ago our interest in coronary occlusion was confined to the post-mortem room. We were taught that this lesion was invariably fatal, and was one of the common causes of sudden death. To-day we know that not only do many of these patients survive, but that some are sufficiently restored to health to resume their former occupations. Further, the symptom-complex produced by coronary occlusion is generally sufficiently characteristic to enable us to recognise the condition during life. It differs from angina of effort in the following respects. The attack is not brought on by exertion or emotional excitement. It often occurs during the night, waking the patient from sleep. The pain is not relieved by rest or by nitrites. It generally lasts for many hours and, in severe cases, yields only to full doses of morphia. The attack is often accompanied by a considerable fall in blood pressure and symptoms of profound shock. The pulse may be rapid and irregular, and the patient frequently vomits. The attack may be followed by slight fever and a polymorphonuclear leucocytosis in the blood. A transient pericardial rub may be heard, and characteristic changes in the electrocardiogram are usually present. In all these respects the clinical picture of myocardial infarction differs from that of the ordinary angina of effort. On the other hand, the character, site, and distribution of the pain are so similar in the two conditions that one is compelled to believe that the underlying mechanism responsible for the production of the pain must be the same. In the one case, the pain passes off in a few minutes; while, in the other, it may persist for many hours. This is what one might expect; for whereas, in the angina of effort, ischæmia of the heart muscle is merely a transient phenomenon, due to a relative shortage of oxygen, in coronary occlusion, a part of the heart muscle is completely robbed of its blood-supply.

NEURO-CIRCULATORY ASTHENIA

In this condition there is no structural cardiac lesion, but the response of the circulatory and respiratory mechanisms to exertion is excessive, as it is in the case of heart disease. Palpitation, dyspnœa, precordial pain, dizziness, fatigue, faintness, and sweating are the common symptoms. During the Great War these symptoms were frequently observed in men who had been accustomed to lead a sedentary life, and whose circulatory mechanism was incapable of adapting itself to the more strenuous demands of active service. The condition was commonly known as "D.A.H." In spite of the fact that these patients had no structural heart lesion, even prolonged treatment often failed to restore the cardiac reserve to its former level, and some permanent disability remained. Similar symptoms had been observed in soldiers in the American Civil War and in other campaigns, but it was not until 1915 that the syndrome was exhaustively investigated. Neuro-circulatory asthenia, however, is not confined to soldiers; it occurs in civil life and affects women as well as men. It is a common aftermath of influenza and other acute infections, and may sometimes be attributable to focal sepsis in the teeth, tonsils, nasal sinuses, gall-bladder, and elsewhere.

The lesson which the war taught us was that these patients should be treated by graduated exercise and not by rest. This principle might well be more generally applied to the treatment of patients with organic heart lesions. A cardiac patient should not be confined to bed unless he is suffering from some acute lesion, such as acute rheumatic carditis or myocardial infarction, or unless he manifests gross signs of heart failure—i.e., venous engorgement with œdema, or frequent attacks of angina provoked by slight exertion. The patient with high blood pressure or with a chronic rheumatic heart may, it is true, derive great benefit from an occasional day in bed, but apart from this he should be encouraged to take exercise within the limits of his tolerance.

In this connexion I am tempted to say a few words about exercise-tolerance tests. In the case of any patient of average intelligence, a detailed history will give more reliable information than can be obtained from any set test. But, when a test is deemed necessary, it should be one which calls into play only those muscles which the patient is accustomed to use, and involves movements which he is in the habit of making. Walking quickly up two or three flights of stairs I regard as one of the best of such tests. Here, again, a word of warning is necessary. It is customary to take three counts of the pulse, one immediately before the test, the second immediately after, and the third two minutes later Numerical results such as these are apt to give a false

* An address delivered at the opening session of the Mid-Staffordshire Medical Society on Oct. 2nd, 1934.

impression of accuracy, and I prefer to disregard the pulse-rate and to base my conclusions on the presence of dyspnœa or other signs of distress following the exercise. One must take into account also the temperament of the patient, for the highly strung, nervous individual will rarely do himself justice on such occasions.

THE THYROTOXIC HEART

It has long been recognised that in the type of hyperthyroidism which we now call secondary Graves's disease, the type in which the goitre is nodular and has been present for many years prior to the appearance of toxic symptoms, the cardiac rather than the nervous manifestations dominate the picture. The hearts of these older patients cannot tolerate the strain of long-continued tachycardia, and auricular fibrillation often supervenes.

A further advance in this field has taken place within the past few years. We now know that auricular fibrillation may be the sole manifestation of thyrotoxicosis, in the condition termed "masked" hyperthyroidism. This is a possibility which should be borne in mind in all cases where the cause of fibrillation is not apparent. Small doses of iodine may result in the restoration of normal rhythm in these patients.

Diagnostic Methods

ELECTROCARDIOGRAPHY

In pre-war days electrocardiography was still on probation; it was largely concerned with the recognition of the different types of cardiac arrhythmia. To-day these can generally be recognised without its aid, and electrocardiography fulfils a more important function in providing evidence of degenerative and inflammatory changes in the myocardium. Three examples will serve.

The pain of coronary occlusion may closely simulate that of an acute abdominal condition such as cholecystitis. It may be confined to the epigastrium, accompanied by vomiting, and associated with localised muscular rigidity. When one does not see the patient in the attack, and has merely the history to go upon, the differential diagnosis may present great difficulty. Here an electrocardiogram is invaluable, for in about 75 per cent. of cases of myocardial infarction, the record exhibits a characteristic change in the form of the ventricular complex, which is not seen in any other condition.

A patient comes complaining of precordial pain, or of attacks of nocturnal dyspnœa. Physical examination proves negative. It may be difficult to determine from the history whether the pain is anginal, or merely attributable to a neurosis. Here again an electrocardiogram exhibiting bundle branch block or other evidence of myocardial degeneration would help to clinch the diagnosis.

A young man has recently suffered from subacute rheumatism. Electrocardiographic examination reveals a prolonged P-R interval, indicating impairment of conductivity in the junctional tissues between auricle and ventricle. This is an unmistakable indication that active trouble is still present in the heart, and a clear warning that we must proceed with the utmost caution. In cases such as these an electrocardiogram may yield information which can be obtained in no other way—objective evidence which is invaluable from the point of view of diagnosis, prognosis, and treatment.

A normal electrocardiogram, on the other hand, does not necessarily signify that the heart is healthy. As in the case of the Wassermann reaction, a negative finding carries little weight. Again, I cannot overemphasise the fact that electrocardiography, like radiography and all other laboratory methods of diagnosis, must not only be considered in conjunction with, but must be subordinate to, the clinical findings. To base a diagnosis on the electrocardiogram alone is to bring electrocardiography into disrepute. No clinician of experience would allow a radiogram or an electrocardiogram to override his bedside diagnosis, when the evidence derived from the history and physical findings is adequate, much as he would value the additional information derived from those sources when the clinical evidence is inconclusive.

Electrocardiography is a highly specialised subject, and the interpretation of all but the simplest pathological variations in the electrocardiogram call for the experience of those who have seen thousands of such records. Nevertheless, I do feel that every medical practitioner should understand the object of electrocardiography, and should know the type of case in which this special method of examination is likely to help him in his practice. It is especially in those patients with coronary arterial disease in whom the physical examination reveals little deviation from the normal that the additional objective evidence furnished by the electrocardiogram is so important.

RADIOGRAPHY

Before the war, apart from the recognition of aneurysms of the thoracic aorta, little use was made in heart cases of radiography. Now I like, if possible, to have at least a screen examination in almost every case of heart disease. In children and in thin persons percussion can often yield a considerable amount of information; but in patients with emphysema and obese subjects it is merely a waste of time. A radiogram with the patient facing the screen gives us an accurate outline of the heart and great vessels. It tells us everything that we can learn from percussion, even under the most favourable conditions, and it does so with a much greater degree of accuracy. The shape of the cardiac silhouette, with the patient facing the screen, enables us to tell which chambers of the heart are enlarged; but that is not all, for by placing the patient obliquely, with his right or his left shoulder to the screen, we can look through the posterior mediastinum and see the posterior aspect of the heart as well as the descending portion of the aorta. If the patient be made to swallow a mouthful of barium, the indentations on the œsophagus produced by the aorta, the pulmonary artery, and the left auricle are clearly outlined. This facilitates the recognition of dilatation of these three structures.

Radiography has modified considerably our conception of the anatomy of the heart. It has taught us that enlargement of the right ventricle shows itself by a bulge on the *left* heart border, whereas the left auricle, when it dilates, extends first backwards towards the spine and then outwards to the right. In cases of extreme dilatation the left auricle may form the *right* border of the heart shadow. It may even give rise to signs simulating those of a right-sided pleural effusion, and cases have been recorded in which the left auricle has, under this misapprehension, actually been tapped in the right axilla. Radiography enables us to visualise the thoracic aorta throughout its course and to obtain accurate measurements of the calibre of the aorta. It indicates the presence of atheromatous changes by an increase in density of the aortic shadow. Calcified plaques in the aortic wall are clearly shown, and calcification of the aortic and mitral valves produces a striking X ray picture.

Radiography is the only means we have of recognising dilatation of the pulmonary artery and its branches during life. These lesions have previously defied recognition. In the rare congenital abnormality, coarctation of the aorta, the radiogram shows notching of the ribs produced by the dilated intercostal arteries. Radiography should be regarded not as a new departure like electrocardiography, but rather as an improved method of inspection which takes the place

of percussion. It enables us to detect with certainty minor degrees of cardiac enlargement which percussion fails to reveal, and by telling us which chambers of the heart are affected, it provides a clue to the cause of the enlargement. There are, I believe, few cases of heart disease in which we can afford to dispense with the additional information given by electrocardiographic and radiological investigations.

Therapeutics

DRUGS

The value of digitalis in the treatment of patients with œdema and a rapid and irregular pulse was clearly recognised by Withering 150 years ago. This important discovery subsequently led to the indiscriminate prescribing of digitalis in all types of heart disease. To Mackenzie is due the credit of pointing out that this was wrong. His researches proved that the "pulsus irregularis perpetuus" resulted from fibrillation of the auricles, and not from "mitral disease," as was generally believed. He showed further that dramatic results from digitalis therapy were obtained only in this type of arrhythmia.

The standardisation of digitalis by biological assay paved the way for Eggleston's work on the massive dose method of oral administration. The amount necessary to produce full digitalisation varies with the body-weight of the patient, and Eggleston found that for a man of 10 st. about 32 grains of the powdered leaf or 6 drachms of the tincture were required. He showed further that, in cases of urgency, provided that the patient had not previously been taking any drug of the digitalis group, one-third to one-half of the total quantity required could safely be given as an initial dose, followed six hours later by one-fifth to one-quarter, and after another six hours by one-eighth to one-sixth. By this means full digitalisation can be produced in 18 hours as compared with five or six days by the dosage usually employed.

Strophanthus as an alternative to digitalis is now much less commonly prescribed than in days gone by. The results obtained from strophanthus are no better than from digitalis, and its action is much less certain. This appears to be due to irregular absorption of the drug from the alimentary tract. On the other hand intravenous strophanthin is a reliable remedy in urgent cases where immediate results are essential. But even in these cases digitalis given by the massive dose method has largely superseded strophanthus.

In the treatment of fibrillation, digitalis is still pre-eminent; though, in suitably selected cases, its younger rival quinidine is superior, in that it not merely controls but actually abolishes the fibrillation. The action of quinidine in auricular fibrillation is one of the few examples in therapeutics of a drug producing a radical alteration in the mechanism of an organ. Unfortunately it is only in those cases in which the fibrillation is of recent origin, and where the heart muscle is sound, that normal rhythm, when restored by quinidine, is maintained. Heart failure with œdema is a definite contra-indication to the use of this drug; for, when the fibrillation is of long standing, the danger of cerebral embolism is increased by the restoration of normal rhythm, and it is safer merely to control the ventricular rate with digitalis.

Another romance of therapeutics is the control of the acute cardiac and mental crises of Graves's disease by means of iodine. I had the good fortune to spend ten days at the Mayo Clinic in 1924, shortly after Plummer had published the results of his work on this subject. The introduction of iodine therapy has revolutionised the treatment of Graves's disease. It has so reduced the operative risk and the post-operative complications, that subtotal thyroidectomy has become the method of choice in the majority of severe cases; while, as a life saving measure, in cases of extreme urgency, its action is comparable to that of insulin in diabetic coma.

The mercurial diuretics have attracted considerable attention since the war. Novasurol given intravenously, in conjunction with ammonium chloride by mouth, gave excellent results, but symptoms of mercurial intoxication were not infrequent. Salyrgan has proved much less toxic and equally efficacious. It may be used over long periods of time and will often provoke a diuresis amounting to 100 to 200 ounces in 24 hours in a patient whose output had previously been less than a tenth of that amount. Salyrgan should be given intravenously, every four days (2 c.cm. of a 10 per cent. solution diluted to 10 c.cm. with normal saline). It is especially in those cases where the heart failure is associated with normal rhythm that the pre-eminence of salyrgan over other diuretics is so striking.

On the opposite side of the account one must note that discredit has been thrown on certain drugs which used to be universally employed. The use of nitrites in the routine treatment of angina pectoris is a case in point. Carefully controlled observations by Evans and Hoyle have shown that continuous treatment with these drugs produces no effect whatsoever in diminishing the frequency of attacks, equally good results being obtained with a simple placebo. Where they are effective is in aborting attacks, and in preventing individual attacks if given at such times as an attack is expected (i.e., before some unavoidable exertion). Their action is so short-lived that they do no good if given in a routine manner at regular intervals throughout the day.

Oxygen therapy has made great strides in recent years. In 1915 the treatment of soldiers suffering from chlorine gas poisoning became a problem of great urgency, and Haldane introduced the closed mask method for the administration of oxygen. This was a striking advance on the old open method, by which it was quite impossible appreciably to raise the tension of oxygen in the alveoli of the lungs. As an alternative to the closed mask, a nasal catheter or other similar device may be employed. Benefit from oxygen therapy is only to be expected in those cases in which anoxæmia is attributable to defective aeration of the blood in the lungs. It is therefore chiefly in heart failure secondary to such conditions as bronchitis, emphysema, or pneumonia that this type of treatment is of value. It cannot be expected to relieve a patient whose cyanosis is due to a sluggish circulation, or to shunting of the blood from the right to the left side of the heart as occurs in some congenital heart lesions. In cases such as these the blood is fully oxygenated in the lungs, and the defect lies elsewhere.

SURGICAL TREATMENT

I have already referred to the cure of Graves's disease by subtotal thyroidectomy. It is important that this measure should be carried out promptly, especially in elderly patients, if we are to prevent permanent cardiac damage. During the past two years total thyroidectomy in patients with advanced heart failure, due to causes other than thyrotoxicosis, has been performed in a considerable number of cases, mostly in America. The rationale of this procedure is that whereas the reserve of the damaged heart cannot meet the oxygen requirements of the patient when his metabolism is normal, it may suffice to do so when the metabolic rate is considerably reduced. By total thyroidectomy the patient is rendered myxœdematous, and his metabolism can then be suitably controlled by the oral administration of thyroid extract. The results hitherto obtained are

encouraging, and considerable clinical improvement, as shown by the disappearance of œdema or of anginal symptoms, has been reported. The procedure is of course merely palliative, but in some cases it enables a patient previously bed-ridden to enjoy a greater amount of liberty.

Surgical measures for the relief of pain in angina pectoris have been practised by various workers both on the Continent and in America during the past 20 years. Good results have been obtained by the injection of alcohol into the dorsal root ganglia, and various modifications of the operation of cervical sympathectomy have been tried. Hitherto these procedures can hardly be regarded as having passed the experimental stage. We are at present handicapped by our lack of knowledge concerning the afferent pathways by which cardiac pain reaches the brain. It is difficult to foresee what results these researches may yield; for, although the relief of pain is a fundamental consideration, the pain in angina of effort does serve a useful purpose as a danger signal. It enables the patient to know what he can do with safety, and clearly defines his limitations. Unless, therefore, we can also treat the underlying condition responsible for producing the pain, we may be putting into his hands a two-edged weapon.

On the other hand, very encouraging results have been obtained during the past few years in the treatment of thrombo-angiitis obliterans by lumbar sympathectomy. This operation abolishes spasm in the affected vessels, and if undertaken sufficiently early may result in a complete cure. It seems possible that, in suitably selected early cases of angina pectoris, coronary spasm might be similarly prevented.

The Present-day Conception

Our present conception of heart disease is based on a long series of clinical and experimental observations dating back to the time of Harvey's discovery of the circulation of the blood. As a result of these observations certain definite facts have been established and will hold good for all time. In addition to the facts, there have been put forward, from time to time, various hypotheses—that is to say tentative explanations to account for clinical and experimental observations. New observations by adding to our knowledge often render the old hypotheses untenable, and new hypotheses have to be formulated to take their place. All these facts and hypotheses, however, are merely the bricks of which the edifice of cardiology is built; and it is not the bricks themselves but the manner in which those bricks are put together that gives to the building its style and character. If we stand back and view the completed structure as a whole, certain features catch our eye while others appear insignificant, and it is only by standing sufficiently far off that we are able to appreciate the relative values of these different features and to see them in their true perspective. Similarly, it is only by the lapse of time that the new facts and hypotheses can assume their true proportion and be harmoniously blended with the old.

In cardiac edifices built during the past 50 years three distinct styles of architecture are discernible. At the beginning of that period the architect was a morbid anatomist, who was primarily interested in structural lesions, more especially defects of the heart valves. This was the epoch of the murmur hunters. Towards the end of last century, medical opinion began to rebel against the dictatorship of the stethoscope; it was obvious that the significance of murmurs had been over-emphasised and that other signs and symptoms were of more importance. Clinicians tended to hark back to the ideas of the pre-auscultation era, and buildings in a Renaissance style began to crop up. In these the older ideas were revived and amplified. More attention was paid to symptoms and less to physical signs. The response of the heart to effort was taken as the measure of its efficiency. Mackenzie was the leading exponent of this school. His central theme was heart failure.

Since the war the style of the cardiac edifice has again been modified. Whereas, for Mackenzie, heart failure was the central feature, we now believe that the underlying cause of the heart failure is even more important. Take for example the question of auricular fibrillation leading up to congestive heart failure. Mackenzie was the first to point out that auricular fibrillation was the cause, and not the result, of heart failure, and that this arrhythmia was responsible for the majority of cases of heart failure with venous engorgement. Auricular fibrillation therefore came to take precedence in Mackenzie's view over all other features, save the heart failure itself, because it was regarded, and rightly regarded, by him as the precursor of that condition. We now know that auricular fibrillation may be merely a transient disorder. That type of fibrillation, for example, which is attributable to thyrotoxicosis can generally be abolished by subtotal thyroidectomy; and provided the hyperthyroidism be adequately controlled, normal rhythm may not only be restored, but permanently re-established. It is for that reason that the underlying cause of the disorder has come to be regarded as even more important than the disorder itself. Whereas the diagnosis, in Mackenzie's day, would have been "*heart failure* resulting from auricular fibrillation," it is now "*thyrotoxic* auricular fibrillation with heart failure."

To take another example, heart failure supervening on an attack of acute bronchitis may disappear when the bronchitis clears up; whereas that which develops in the later stages of cardio-aortic syphilis is always progressive. The important features here are not the heart failure but the bronchitis and the cardio-aortic syphilis. The heart failure is merely an episode in the course of the disease, in the one case transient, in the other terminal.

To-day we regard ætiology as the most important consideration in the diagnosis of a cardiac case, and it is convenient to classify patients complaining of cardiac symptoms in three groups:—

(1) Those who have permanent structural lesions.

(2) Those who are suffering merely from some toxic affection of the myocardium.

(3) Those whose symptoms are due to an anxiety neurosis.

This classification is of great importance from the point of view of prognosis, since the toxic and neurotic elements are generally amenable to treatment, whereas the structural lesions produce a permanent disability. In most cases however two if not all three factors—structural damage, intoxication, and neurosis—are present, though in varying degree. Anginal symptoms in a patient with coronary disease, for example, may be aggravated by dietetic and other indiscretions—e.g., tobacco—while the element of neurosis can hardly ever be entirely lacking from such a case. Similarly the symptoms in a patient with some slight congenital or valvular defect may be chiefly attributable to neurosis, for which his medical attendant or some sympathetic but over-anxious relative is to blame. The capacity to assess the importance of each of these several factors in the particular case, and to regulate treatment accordingly, is the measure of the ability of the physician.

CONTINUOUS SUCTION DRAINAGE

WITH AN ACCOUNT OF A CASE OF BILATERAL EMPYEMA TREATED BY IT

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THE material required for the construction of the apparatus (Fig. 1) consists of: two Winchester bottles (B and C), a drainage bottle (A), a glass irrigating reservoir (D), three rubber stoppers to fit bottles A, B, and C, some lengths of glass tubing, a Y-shaped glass connexion, a T-shaped glass connexion, rubber pressure tubing, and some spring clips.

The drainage bottle (A) is placed on a table at the bedside, together with one of the Winchesters (B), while the irrigating reservoir (D) is placed on an upright stand attached to the table. The second Winchester (C) is placed on the floor beside the table. Bottle A is fitted with a rubber stopper through which pass two short lengths of glass tubing. Bottles B and C are similarly fitted with rubber stoppers through each of which pass one long and one short length of glass tubing. Bottles B and C act as syphon bottles—water being made to syphon from B into C. The suction of air into B as the water leaves it provides the motive force of the apparatus. This force is supplied to the pleural cavity through a catheter which is inserted between the ribs. Bottle A acts as a drainage trap, while a side connexion from the catheter, to the reservoir, D, enables intermittent irrigation to be carried out. Communication between the various units of the system is effected by rubber tubing.

The end of the catheter is attached to a Y-shaped glass connexion, one limb of which is connected by rubber tubing to one of the glass tubes passing through the stopper of bottle A, while a second length of rubber tubing

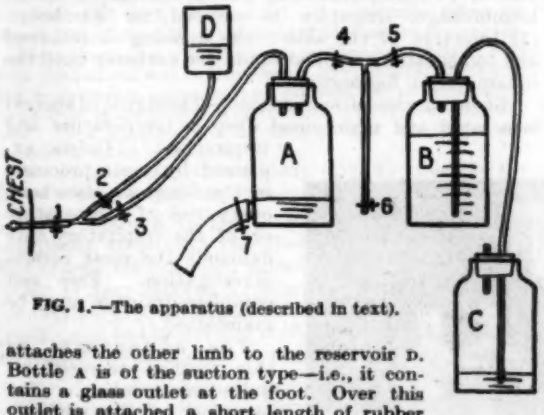

FIG. 1.—The apparatus (described in text).

attaches the other limb to the reservoir D. Bottle A is of the suction type—i.e., it contains a glass outlet at the foot. Over this outlet is attached a short length of rubber tubing of sufficiently wide diameter with its free end closed by a spring clip. From the second of the glass tubes, passing through the stopper of bottle A, a short length of rubber tubing makes connexion to one end of the horizontal limb of a T-shaped glass connexion. The other end of the horizontal limb of the T connexion is attached by a short length of rubber tubing to the short glass tube passing through the stopper of bottle B. To the dependent limb of the T connexion is attached a short length of rubber tubing, which acts as an air-leak tube. During suction this tube is clipped. The long glass tube passing through the stopper of bottle B is attached by a length of rubber tubing to the long glass tube of bottle C. Bottle B is filled with water. Some disinfectant fluid is run into bottle A. Spring clips are distributed as shown in the diagram. Seven clips are required.

TECHNIQUE

The system is essentially a closed one. The smallest air-leak in any part of the apparatus will either render the apparatus useless or so diminish the force of the suction in the pleural cavity as to make the drainage inefficient. In our earlier experience the repeated development of such leaks provided the main difficulty in maintaining effective suction. The apparatus, as described, is designed to avoid this difficulty, and by using the following technique it has proved thoroughly efficient (Fig. 2).

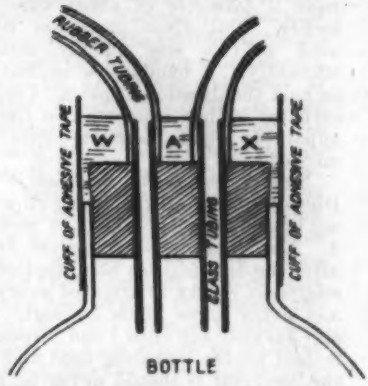

FIG. 2.—Diagram showing the way in which leakage at the mouth of the bottle is prevented.

Bottles A and B are sealed in the following fashion. The glass tubes passing through the stoppers are not right-angled but are simple straight tubes inserted through holes bored in the rubber stoppers. The rubber tubing attached to them is pushed over their free ends until it comes in contact with the top of the rubber stopper. Round the neck of each bottle a broad cuff of adhesive tape is applied into which is poured melted wax. On setting, this effectively seals the joints (*a*) between the stopper and the bottle, (*b*) between the glass tubes and the stopper, (*c*) between the rubber tubing and the glass tubing entering the bottle.

As drainage proceeds, the water in bottle B slowly syphons into bottle C, and after an interval of some six to ten hours will require to be returned to bottle B to allow suction to continue. To carry out this manœuvre clip 4 is closed and, with clips 5 and 6 open, bottle C is held above the level of bottle B and the water syphoned back into B. The air in B escapes through the open air-leak tube attached to the dependent limb of the T connexion between bottle A and bottle B.

The drainage bottle A will also require to be emptied after it has filled with drainage fluid. To do this clip 3 and clip 5 are closed; clip 4, clip 6, and clip 7 opened. The drainage then runs out through the outlet opening of bottle A. When bottle A has emptied, a little disinfectant fluid is run in. Clip 6 and clip 7 are then closed and clips 5 and 3 opened. In this way it is possible to keep the apparatus working without disturbing the sealed bottles A and B.

Air leaks may occur where rubber tubing is attached to glass connexions. In this case some narrow adhesive tape bound over the leaking union effectively closes it. The joint between the drainage tubing and the glass outflow opening, at the foot of bottle A, must also be airtight. This can be conveniently sealed by painting the connexion with varnish.

The apparatus having been carefully prepared and tested to exclude air leaks, the catheter is inserted into the pleural cavity. Pressure rubber tubing should be used throughout.

Insertion of the catheter.—The catheter used is a No. 10 Dowse's type of self-retaining catheter. Under local anæsthesia an incision is made in the skin, and a trocar and cannula, just large enough to admit the catheter, is inserted into the empyema cavity. The trocar is then withdrawn and the catheter inserted by means of an introducer. The introducer

is withdrawn and the cannula removed. Precautions are taken to prevent air entering the chest.

The dressing.—The dressing at the chest wall must be made air-tight. To do this, pledgets of gauze or cotton-wool are soaked in collodion and applied in successive thin layers round the catheter. The dressing should have a diameter of about three inches. Collodium acetonum is used as this sets quickly and efficiently. A bandage is applied to hold the dressing in place. The catheter is then connected to the apparatus and suction commenced.

Management during treatment.—During suction all the spring clips are left open except clips 2, 6, and 7. No irrigation is carried out for at least six hours after the dressing has been applied. Subsequently the empyema cavity is irrigated every two hours by day and every three hours by night. During irrigation clip 3 is shut and clips 1 and 2 open. Dakin's solution is used for the irrigating fluid and the level of fluid in the reservoir D should never be more than eighteen inches above the opening in the chest wall. Irrigation is carried out more frequently if necessary, the main indication being to maintain free drainage.

The quantity of fluid run in is controlled by its effect on the patient. Coughing or pain is an indication to stop. Should the patient prove unusually sensitive, the fluid should be warmed and run in very slowly. The progress of the case may be observed by comparing the quantity of Dakin's solution used with the quantity of drainage recovered from the bottle A each day. For this purpose it is an advantage to have the reservoir D graduated. It is advisable to keep the side connexion to the reservoir D as near to the catheter as possible. In this way the minimum of pus is washed back into the empyema cavity during irrigation.

The following *difficulties* may be encountered :—

(1) *Blockage of the catheter.*—Milking the rubber tubing either towards or away from the chest usually overcomes this difficulty. Should it fail it may be necessary to disconnect the catheter and syringe it through with a little Dakin's solution.

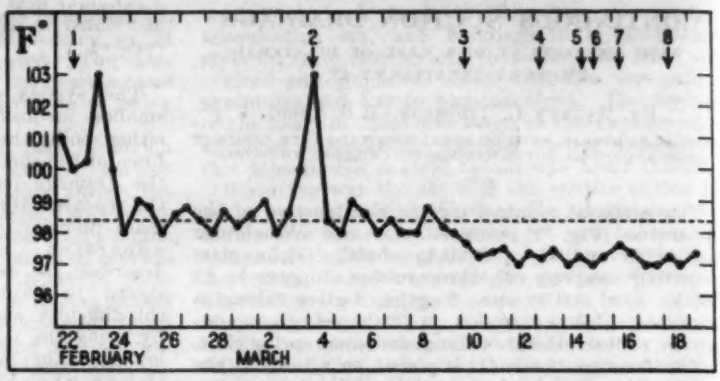

FIG. 4.—Temperature chart. 1=closed drainage started (left side). 2=closed drainage started (right side). 3=catheter removed from left side. 4=wound on left side closed without drainage. 5=catheter removed from right side. 6=patient allowed up. 7=patient walking. 8=wound on right side closed without drainage.

(2) *Air leaks in the apparatus.*—These do not occur if the apparatus has been carefully constructed. It may be necessary to reseal one of the bottles. The leak is located by first closing clip 5 and observing if the water level in B drops. If it does, bottle B is resealed. The same; procedure is followed with clip 5 open and clip 4 closed; and again, with clip 4 and clip 5 open and clip 3 closed.

(3) *Non-airtight dressing at the chest wall.*—The dressing must be replaced and irrigation discontinued for six hours.

(4) *Restlessness of the patient.*—The presence of the catheter is usually well tolerated and restlessness is readily controlled by sedatives.

Two *complications* must be considered. (1) Blood-stained washings: if the washings are only tinged with blood, the suction is reduced by raising bottle C one or two feet from the floor; if there is much hæmorrhage, irrigation is stopped for 24 hours. (2) Infection of the skin: the dressing is removed and fomentations applied round the catheter until the inflammation has subsided.

Advantages and disadvantages.—The signal of success is a rapid and maintained drop in temperature and respirations. Unless explained by acute processes in the lungs or elsewhere, every rise of temperature or of the respiratory rate demands the most careful investigation. Free and complete drainage must be maintained.

The advantages of this method scarcely require enumeration. The insertion of the catheter is a minor procedure which causes little disturbance to the patient and can be carried out in patients who are acutely ill. Frequent and painful dressings are avoided. The disadvantages which have brought the method into some disfavour have mainly resulted from the use of an apparatus which is incompletely

FIG. 3.—Bilateral continuous suction drainage in progress.

airtight. The most careful nursing is essential. By following the technique described, the apparatus has been proved entirely trustworthy and the course of the illness remarkably uneventful in the cases treated at the Children's Hospital by this method. The following is an illustration.

CASE REPORT

The patient, a girl aged 8 years, was admitted to the hospital on Feb. 22nd. The parents informed us that she had always been "chesty" but for the past five weeks had been ill with pneumonia. The child was pale and poorly, with rapid and embarrassed respirations. Her temperature was 101° and she showed evidence of an acute toxæmia.

Physical examination revealed signs of a considerable effusion of fluid into the left pleural sac, with some displacement of the heart to the right. Resonance was impaired at the right base and there were numerous bronchitis signs over the right lung. Aspiration of the left pleural sac showed thick pus in which pneumococci were found.

On the evening of admission a catheter was inserted into the left pleural sac and continuous suction drainage commenced. The temperature soon fell and the patient remained practically afebrile until ten days later, when the evening temperature rose to 100°. As drainage of the left pleural sac had proceeded satisfactorily and the dullness at the right base had increased, the right pleural cavity was explored and pus aspirated, which contained pneumococci. On the morning of March 4th a second catheter was inserted into the right pleural cavity and suction drainage of the right side commenced. The patient speedily became afebrile and her condition improved rapidly. The photograph (Fig. 3) shows the apparatus in action. On March 10th, seventeen days after its insertion, the catheter was removed from the left pleural cavity, drainage on this side having become negligible. Three days later the wound became closed with a healthy scab. On March 14th, eleven days after its insertion, the catheter was removed from the right pleural cavity and four days later the wound became closed with a healthy scab. On March 15th, three weeks after admission, the patient was allowed up and next day was permitted to walk a few steps.

During the afebrile stages of the disease, lung expansion was encouraged by the use of blow-bottles. As the appetite improved she was given a high protein diet, supplemented with cod-liver oil. A radiogram taken on March 12th showed no evidence of fluid in either pleural sac.

After three and a half weeks in hospital, though still thin, the patient was in remarkably good general condition, had a ravenous appetite, and showed no physical signs apart from some evidence of bronchitis over the left lower lobe. This appeared to be chronic and the cure was considered to be complete.

Reference to the clinical chart (Fig. 4) indicates the degree of efficiency of the drainage.

I am indebted to Dr. C. P. Lapage for his kind permission to publish the above case; to Mr. J. D. McEachern for the main principles of the technique; to Mr. D'Arcy McCrea for a practical introduction to the method; to Mr. Teesdale for his excellent photograph; and to the nursing staff, to whom much of the success of the treatment in the case was due.

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"LOCKING CHILDREN IN."—Under this title the director of the National Society for the Prevention of Cruelty to Children draws attention to "the increasing practice of leaving children locked up in the house alone." Apart from actual fatalities resulting from this practice there are, he points out, serious mental and psychological risks attached to it. In all cases reported to them the Society's inspectors have been able to show that with goodwill and management these risks can be avoided.

THE PERIODICITY OF MICROFILARIA BANCROFTI

By CLAYTON LANE, M.D. Lond.
LIEUT.-COLONEL, I.M.S. (RETD.)

Dr. G. Carmichael Low and Dr. P. H. Manson-Bahr have reported (1934) the careful, accurate, and devoted observations of A. H. Walters carried out in London on a filarial lascar, by means of two-hourly counts of the numbers of *Microfilaria bancrofti* present in the same quantities of his peripheral blood. After comments they reach the following conclusions: "For the moment we, just as Manson did some 50 years ago, believe that filarial periodicity is best explained by parturition going on more or less continuously, the young being, as Manson put it, nearly constantly carried along the lymphatics and thoracic duct to the blood, while the excess that would in time take place is checked and kept more or less constant by a mortality amongst the older and effete embryos." Against this view, here restated, I have already (1929) brought forward facts and considerations which best explain this periodicity by a simultaneous timing of the cycle of parturition of all live female worms, so that broods of embryos are simultaneously poured into the blood, and rapidly removed therefrom and destroyed. Most of the points in that line of argument have been accorded no comment by these writers; yet I will extend to them the courtesy of a detailed consideration of the views expressed in their last paper.

In the arguments they use, assumption has an undue place; and it is in the interest of tropical medicine that this should be made clear. For if large numbers of microfilariæ are destroyed daily, the organ or tissue which does this is being subjected to continuous overwork, with loss of that potential reserve on which the body should be able to fall back in times of stress; and there is the likelihood, or certainty, that it will eventually suffer permanent structural change. In other words the matter is not one of mere academic interest, but affects the daily lives of hundreds of thousands of people.

Having found that, judging by blood samples of the same size taken every two hours, night and day, the total number of microfilariæ was much the same over 24 hours whether periodicity was of normal distribution or had been disturbed by altering the sleeping hours of the host, these writers conclude with emphasising italics that this finding points strongly to daily migration and reappearance of the same undamaged embryos rather than to the regular death and exact numerical parturition of embryos by the adult female worm or worms. But one knows on the one hand by the 17-year-old work of Warrington Yorke and B. Blacklock (1917) that a microfilarial total of this sort need not be so exact, as is here reported, when microfilarial periodicity is changed by mere altering of the hours of sleep; and on the other hand that when a hookworm or trichostrongylus case is followed day by day, the number of eggs in the fæces has a like rough equality. With the last worms the rough constancy is manifestly due to parturition; accordingly the emphatic assumption that the opposite is the case in filariasis has but a weak foundation. The writers make a return to the subject in these words: "This [constancy], we hold, indicates a more or less constant stream of embryos emerging from the uteri of the adult worm daily, with a corresponding destruction constantly going on, other-

wise how account for the constant figure." An average daily constancy of microfilarial numbers must depend on a balance, more or less exact, between production and destruction of embryos, however this is produced. In itself it gives no indication at all as to how that balance is maintained, nor can it rightly be used to support one theory of its causation rather than another. Apparently the reason for the assumption just noted lies in another made in the following sentence. "It seems most unlikely that female *F. bancrofti* should give an even yield of embryos when subjected to adverse circumstances." By this last term there is meant, as the context shows, the change in sleeping hours of the host induced while he remained in London. But what evidence is there that this change constitutes an adverse circumstance? In spite of the early gibe at Sir Patrick Manson which inquired whether the periodic filariæ which he described kept watches, these creatures are timekeepers, and the time they keep is local time. Whatever the longitude, they are, in persons living ordinary lives, found in greatest numbers in the peripheral blood about midnight. The man whose case is now being considered came from Calcutta, where the embryos must have swarmed as usual about midnight local time. When he came to the Greenwich meridian and the embryos swarmed, as they did about midnight local—that is Greenwich—time, their hour of swarming had in fact been shifted half-way round the clock by Greenwich time since their host left Calcutta, and yet they gave a typical periodicity chart. Similarly in Warrington Yorke and Blacklock's case cited above, the embryos had during his voyage from Australia undergone a shift right round the clock by Greenwich time, and yet they too gave a typical periodicity chart. What justification is there for assuming that in the lascar a further alteration in sleeping hours, induced without altering his longitude, constituted an adverse circumstance? The making of such an assumption can hardly be held to point strongly to the causation of periodicity as lying in one direction rather than in another.

There is next described the transference into the heart of a guinea-pig of great numbers of microfilariæ, their immediate disappearance from the blood, and a failure to find them in all the organs which were subsequently examined; and the question is asked, "What is it that determines the sudden death and disintegration of the embryo in incompatible blood in the guinea-pig?" There are two assumptions here. There is no evidence that there was sudden death and destruction of the worms; there was immediate disappearance, but its reason remains in doubt. It is assumption to state, before seeking evidence, that the blood of the guinea-pig is incompatible with the survival in it of *Mf. bancrofti* and so is the cause of sudden disappearance of the latter, for that seems to be the meaning of the sentence. Such a confident statement should have been withheld till the matter had been tested. In this connexion the writers should, for completeness of evidence and with a view to displaying all aspects of the problem, have mentioned the work of F. Murgatroyd (1933) of the Liverpool School of Tropical Medicine, who injected *Mf. bancrofti* from man into the veins of man and experienced exactly the same dramatic disappearance as is here noted for the guinea-pig. Since specific incompatibility of blood is manifestly not the cause of this disappearance in the one case it would here too have been more fitting to withhold a confident expression of opinion that it held for the other until these members of the staff of the London School of Hygiene and Tropical Medicine had verified or confuted Murgatroyd's experiment.

POST-MORTEM FLOW OF BLOOD AND LYMPH

Next is cited Manson's classical filarial case in which, after death from prussic acid, the blood of heart, great vessels, and lungs was found swarming with microfilariæ. In commenting on it, the conviction of Low and Manson-Bahr is that the embryos would at once have been immobilised by this poison, and then this sentence follows: "Even if the embryos had escaped in these poisoning cases or remain alive in cases dying of ordinary causes, how could embryos enclosed in a sheath find their way from the periphery, from the legs and arms, into the large vessels of the thorax and lungs after the circulation has stopped and the blood and lymph are no longer flowing." It must not be concluded from the wording of this sentence that the embryos which Manson found in his case came from the arms and legs. In his original report on it, which is not retained in Dr. Manson-Bahr's last edition of Manson's "Tropical Medicine," is found the description of a huge lymphatic varix occupying the pelvis and back part of the abdominal cavity and containing many adult filariæ. Similarly in the case now reported, small X ray shadows suggested calcified filariæ in the abdomen, and the work of O'Connor et al. (1930) has shown that where calcified filariæ have been found, there living ones also must be expected. Having excluded the possibility of misunderstanding here, the way is clear to discuss the matters indicated in the heading.

The post-mortem flow of blood.—The writers quote an experiment by Manson in which he found enormous numbers of embryos of *Dirofilaria immitis* in the heart's blood of a dog after its death from prussic acid, the assumption being that the findings after death show the state of things in the circulation at death. Fülleborn (1908, 1929) reported a similar finding after the death of a dog with this infection, but he had controlled his experiment in a manner in which Manson did not. He had punctured the heart during life and found about the same numbers of microfilariæ in its blood as were present in cutaneous blood, yet the left ventricle after death contained them in enormous numbers. The conclusion of this experienced helminthologist, a conclusion which seems unshakable, was that the embryos had obviously reached the ventricle from the lungs after death. If it is reasonable to conclude that they did so in Fülleborn's dog, it is unreasonable to insist that they cannot have done so in Manson's man. As the result of this controlled experiment Fülleborn pointed out that microfilarial numbers in different parts of the circulatory system alter greatly after death; their numbers after death are not necessarily evidential of their numbers during life. But if microfilariæ can so pass after death from lungs to left ventricle, it is inadmissible to insist that they cannot equally pass after death from the right ventricle, where the adult worms of this species normally live, to the lungs. That is to say, the finding of large numbers of them in the lungs after death is not valid evidence that they were necessarily there during life. The whole is presumptive evidence of a post-mortem drift of blood away from the arteries where blood pressure was presumably still somewhat the highest at the time of death. There is, of course, other presumptive evidence for a post-mortem flow of blood, but the extent of such flow seems never to have been measured in the way in which the post-mortem flow of lymph has been.

The post-mortem flow of lymph.—The assumption that lymph ceases to flow through the thoracic duct after death from cyanide poisoning has been proved to be incorrect. Acceptance of this assumption was implicit in my suggestion (1929) that female worms may well empty their uteri in a dying host, the implication being that lymph still flowing till death would carry the embryos to the spots where Manson found them after death. But subsequently, the kindness of Prof. F. W. O'Connor of Columbia University, New York, placed in my hands a monograph (1933) by Prof. Cecil K. Drinker and Miss Madeleine Field, Ph.D., of Harvard University, Boston. As they note (p. 110), F. A. Bainbridge (1906) reported that thoracic duct lymph flowed freely after death if dogs had been made plethoric with intravenous injections of dextrose, or of saline or peptone solutions, just before they were killed. Now Manson's views on the mechanism of microfilarial periodicity were openly and fundamentally based on the assumption that the findings in his classical case showed the condition of things as they had been at the time of the man's death; and no one, myself included, seems ever to have questioned that assumption. But on becoming cognisant of this 28-year-old observation I felt that cyanide poisoning might also be a producer of a marked flow of lymph after death, while it was clear that if this were so Manson's conclusions were unsound. Accordingly I wrote to Dr. Drinker over a year ago and asked him if he could tell me whether after cyanide poisoning such a flow occurs. He has most courteously investigated the point in two of his accurately measured experiments on dogs, has sent me the protocols by the hand of his colleague Dr. Field, and has given me his very generous permission to use them.

Under nembutal anæsthesia the thoracic duct of each dog was cannulated and the lymph flow measured. There was then injected into the jugular vein 1 c.cm. per kg. of a 1 per cent. solution of potassium cyanide; the breathing stopped after 30 and 60 seconds and the heart after 180 and 90 seconds, but the lymph continued to flow for 97½ minutes and 33 minutes respectively. As to its quantity, in one dog the flow of lymph during the first 4 minutes and 40 seconds after the heart stopped was half as much as it had been for 20 minutes before the cyanide injection; while in the second the amount of lymph flow measured during the 20 minutes before the injection and the 20 minutes after the heart stopped beating were practically identical, and in its case the total quantity of lymph flow after death was 5·9 c.cm., the dog weighing 15 kg.—which quantity corresponds to about 24 c.cm. in a man of 75 kg.

The belief then that after death from cyanide poisoning the lymph ceases to flow is incorrect. In these experiments it has continued for a considerable time, and has actually been increased in quantity at first. As Prof. Drinker himself puts it to me, "I was greatly surprised, and so was Miss Field, at the length of time the lymph flowed after death, and also with the vigor with which the flow continued." Nor is there justification for concluding that these two experiments display the limits of the flow in duration or quantity. As has been noted, the belief that it ceased at death was the foundation on which Manson built his conclusions, and since his premises, repeated in the paper under consideration, have been shown to be false, his conclusions become invalid. But I think that further inferences on Manson's case must be drawn from these facts newly disclosed by Drinker. Since it must reasonably be concluded that in it a considerable quantity of lymph entered the great vessels and heart after death, and since that acute observer made no mention of its presence as such at these sites, it must have become intimately mixed with blood and, if laden with microfilariæ, have carried them just where he found them. Further, it seems reasonable to deduce that in such a case the post-mortem flow of lymph is greater than it is in an ordinary one of cyanide poisoning; for the force which causes lymphatic vessels to become dilated and varicose is a rise in the pressure of the lymph within them to a point at which it becomes greater than their walls can withstand, their very condition is evidence of increased and persistent lymphatic pressure. When in such a case the pressure in the great veins has fallen after death to its final zero, the increased tension of the lymphatic walls will presumably cause an increased quantity of lymph to flow from a greatly enlarged reservoir into the veins. I think that this conclusion is difficult to avoid, but whether admitted or not, it does not detract from the observed fact that at least in cyanide poisoning the lymph flow after death is considerable and singularly persistent, and that inferences drawn on the assumption that it ceases on death are invalid and untenable.

To sum up, there is, then, direct evidence that, at least after cyanide poisoning, the post-mortem flow of lymph is vigorous and enduring, and indirect evidence that there occurs a post-mortem drift of blood; and it is clear that the effect of both will carry microfilariæ just where Manson found them in his classical experiment. Accordingly his findings are not evidence that at the moment of his patient's death these embryos were in the spots where Manson discovered them some hours later. His report does not disclose a microfilarial daytime haunt, as he thought it did.

A MICROFILARIAL SPICULE

Next, after considering my conviction that it is as physically unthinkable that microscopic microfilariæ should hold their own in the current of the heart and great vessels as that a man should do so by swimming while half-way down the Niagara Falls, the writers conclude: "Why embryos should be able to hold their own against the currents of blood in the heart and large vessels is not clear, but it is a fact that they do." Apparently the justification for this confident assumption lies in an observation quoted from Manson's diary that filarial embryos in a Chinese bird "are provided with an oval spicule and surrounding papillæ by means of which they are able to adhere to the blood-vessel walls, and it is probable that the human embryo filariæ do the same thing. It is a common observation that embryo *F. bancrofti* are able to adhere to a coverslip and to clumps of red corpuscles by this means, and no other use has been suggested for this particular organ, save as a means of anchoring the embryo to the capillary wall." The meaning is obscure, but apparently is that *Mf. bancrofti* too has a spicule surrounded by papillæ by which it adheres to a coverslip or to clumps of corpuscles (strands of fibrin are neither suggested nor excluded as a possible anchor) and that this acts as a holdfast even through the intact sheath. In the many years since Sir Patrick made his observation great strides have been made in microscopic technique and staining, and the inquirer will find no such organ described and pictured, for example, by F. Fülleborn (1929) or L. Feng (1933), in *Mf. bancrofti*, nor will he find it easy to conjecture how any such holdfast, did it exist, could act effectively through the intact sheath as apparently it is supposed to do. And in any case the writers have confined themselves to

the possibility of anchorage to a capillary wall, and do not make it obvious what connexion they see between this and the maintenance by these microscopic creatures of their position in the midst of the churning current of the heart and great vessels, while continuously battered with corpuscles as wide as themselves. That microfilariæ do so maintain themselves is not a fact; it is an assumption whose meagre weight has been made clear by the facts and inductions set out above, and their distribution is actually that which would be expected were they carried to these positions by lymph and blood flow after death.

ANALOGIES WITH DIROFILARIA

Immediately following the sentence claiming the existence of this "fact" comes the following: "The same is true for the adult *Dirofilaria immitis* of the dog which live in the right ventricle of the heart, and which must have taken up their position there, so far as we know, on entering the definitive host after quitting their intermediary, the mosquito." In so far as this sentence may refer to adult worms, Mr. H. A. Baylis, D.Sc., of the British Museum (Natural History), to whom I put the matter, has pointed out a sentence in Fleming's translation of Neumann's book describing how these worms wind themselves almost inextricably round the columnæ carneæ. In other words, they are firmly anchored to the heart wall in a manner which has no analogy with microscopic *Mf. bancrofti* in the conditions which have just been considered. So far as the sentence may refer to the infective larvæ of *D. immitis* as they come from the mosquito it covers another assumption, in the suggestion that they presumably take up and maintain that position as larvæ.

E. H. Hinman et al. (1934) made a mutual exchange of a third of the blood of two dogs, one infected with *D. immitis*, the other clean. Of the microfilariæ injected into the clean dog 92 per cent. disappeared at once, the rest persisting for five or six weeks. In the donor their numbers fell to about a third and did not return to normal at the end of 24 hours. This it was held they should have done, if such periodicity as exists in this worm were due to cyclical parturition of the female with daily destruction of the embryos. In this connexion it is well known that the hookworm which lives on, even though it does not live in, blood has its egg-laying markedly affected by the state of health of the host, and in this case the assumption is that these huge transfusions of blood left hosts and blood-living parasites quite unaffected. It is noteworthy that the number of microfilariæ in the donor's blood five weeks after the blood-letting were twice as many as they had been before it. The conclusion drawn was that in this worm periodicity cannot be due to cyclical parturition and daily destruction of the cyclical brood. Doubtless other experiments will be carried to their logical end. But in transferring inferences from *D. immitis* to *Wuchereria bancrofti*, inadequate weight is being given to the great difference in exactness of the periodicity, to the marked difference of normal habitat which must affect at least the timing of periodicity if due to parturition, and to reports, right or wrong, of other habitats than the heart for *D. immitis*.

THE HEART OF THE MATTER

The naked problem as it now stands is thus modestly shrouded by Low and Manson-Bahr. "There are many other points that one could criticise in the deductions Clayton Lane has drawn from the study of Prof. F. W. O'Connor's sections. The fact that adult filariæ are found all with their uteri empty in blocked and therefore pathological lymphatics does not necessarily mean that this is what takes place when the parasites are inhabiting normal lymphatics." But first three points must be made. Has anyone ever seen live* *W. bancrofti* in really blocked lymphatics? Are lymphatics inhabited by adult live worms ever really normal? Lastly my inductions were not drawn from O'Connor's sections, a statement which makes apposite a brief historical note.

Over five years ago (Lane, 1929) I concluded, after setting out the then available evidence, that periodicity in this infection must be the result of simultaneous parturition by female worms, thus agreeing with the conclusions formed by W. W. Myers 48 years earlier and at once opposed by Manson. It occurred to O'Connor that here was a matter capable of far more direct proof than had hitherto been attempted; that it should be possible to determine by adequate examination whether all live female worms in the same body or tissue were in fact at the same stage of embryonic development, and whether parturition really took place simultaneously at a fixed hour; and it was not till his examinations became fruitful that he wrote of them to me. The conception and details of the investigation and the appraisement of its results were O'Connor's alone; they were instituted and carried to a point where results appeared without my instigation or knowledge. They were entirely independent, and the credit for them belongs to O'Connor alone. Since 1931 I have had many letters from him telling me of the results obtained in further examinations made by himself and his staff on yet more cases of periodic filariasis by means of many thousands of serial sections of lymphatic glands, testicles, and other organs; and I have had the privilege of examining a few hundreds of his slides.

The heart of the matter is this. O'Connor's minute examinations cover a series of cases, and every one of them has shown the same thing. Provided they were alive when excised or when the host died, all female worms from the same source are at the same stage of pregnancy in whatever kind of lymph vessel they lie; and the cycle of pregnancy is so timed, at least in relatively healthy persons, that the birth of microfilariæ takes place about midday. Moreover, as should be well known, he, with C. R. Hulse, checked his results (1932) by correctly foretelling exactly the stage of pregnancy which would be found in females removed with lymph glands excised at a particular hour of local time. In explanation I see only three alternatives. (1) O'Connor has failed to tell the truth; specimens which have been sent to me have been selected ones with the hour of removal or death falsified, and his false story of correct foretelling has been connived at by his distinguished surgical colleagues at Columbia University, Presbyterian Hospital, New York. Prof. O'Connor's friends on either side of the Atlantic would rightly and emphatically resent any such gratuitous suggestion of fraud. (2) O'Connor has been the victim of such an extraordinary series of coincidences as must rarely have beset any investigator; to settle this matter it is merely necessary to add sufficiently to the number of cases investigated. (3) The cycle of embryonic development in females of *W. bancrofti* which show periodicity is really timed simultaneously.

O'Connor's naked claim, when no longer decently shrouded as in the sentence quoted above, is that he has in fact demonstrated precisely that anatomical condition which must be present in female worms if microfilarial periodicity is produced by their simultaneous parturition. His slides constitute an emphatic refutation of the suggestion that there is more or less continuous parturition by each individual female worm, which is presumably what Low and Manson-Bahr mean by the expression used in their conclusion, quoted at the beginning of this paper. O'Connor's preparations show that uteri and vagina

* i.e., Alive when the host died or had the tissues in question cut out of him.

of each female worm gradually fill up with unsegmented ova, segmented ova, embryos coiled in the membranous shell, and sheaves of extended microfilariæ, development steadily advancing as one passes forward towards the vulva. Then, when the genital tubes have filled, there occurs a massive expulsion of the vaginal and uterine contents so that even ova (perhaps only unimpregnated ones which have been swept forward with their developing fellows) are extruded. The worm is left collapsed, wrinkled, and nearly emptied, while in the sinuses of the lymph glands concerned are found microfilariæ and coiled embryos (some of which stages their poorly staining nuclei show to be in process of dissolution) as well as the seemingly unfertile ova. But if the meaning of the expression, as to more or less continuous parturition, is intended to apply to something in the nature of the running of a relay race arranged among the female worms, then the conclusions cannot be maintained, for in periodic filariasis caused by this worm all living females in the same body or excised tissue are observed to be at the same stage of pregnancy or post-parturition, in whatever type of vessel they lie. O'Connor, it may be repeated, has in fact reported the finding of precisely that anatomical condition which must underlie a microfilarial periodicity due to simultaneous parturition. I showed slides of his, exhibiting all these conditions, at a meeting of the Royal Society of Tropical Medicine and Hygiene held in November, 1933. The contrast between the turgid females distended with progeny removed at noon and the collapsed, wrinkled, emptied females removed at 2 P.M. is a notable one.

Obviously the confirmation of the presence of these timed and simultaneous anatomical changes, reported as constantly underlying this periodic filariasis in persons leading normal lives, is a matter of direct examination; and it is particularly capable of being furthered by those who hold teaching offices as do Dr. Low and Dr. Manson-Bahr. For now, as in the past, there must pass yearly through the London School of Hygiene and Tropical Medicine enthusiastic students, through whose good offices there could be examined lymph glands or testes excised at stated hours of local time or removed from bodies where the hour of death was known. The School of Liverpool has in effect a branch in the tropics, and that of Calcutta is even more happily situated. Like everyone else's, O'Connor's work must be independently repeated before it will be generally accepted, and if this is not done in British schools it will be done elsewhere. This is the heart of the matter and the point which first needs attention; to approach the problem otherwise is to put the cart before the horse. My own examinations of O'Connor's slides has left me satisfied as to the accuracy of his observations—namely, that, when the hosts are living normally timed lives, there occur in this periodic filariasis two parallel cycles each of 24 hours' duration (the first a cycle of intra-uterine development ending with parturition normally about midday, the second the well-known one of the swarming of microfilariæ in the blood with its apex about midnight) and that it is merely unreason which after independent confirmation will refuse to connect them as cause and effect. After direct observation has independently confirmed the existence of a cycle of parturition in infection with periodic *W. bancrofti*, it will then be logically fitting to take up an adequate and intensive investigation as to the site of that daily destruction of embryos which must accompany a periodicity due to timed parturition. At present it need only be repeated that as demonstrated by O'Connor's slides which I showed at the meeting mentioned, microfilariæ which reach lymph glands, evidently by the lymph stream, are seen in them in process of dissolution, and there seems no reason against the same fate being undergone by those which reach them through the blood.

CONCLUSIONS

It is held to have been shown above that much that is being put forward as knowledge of infection with periodic *Wuchereria bancrofti* in man is assumption. The central assumption is that in cyanide poisoning the flow of lymph ceases on death, whereas Prof. Drinker, of Harvard University, has found that the post-mortem flow in this condition is considerable in duration and quantity. It was essentially on a death from hydrocyanic poisoning that Sir Patrick Manson based his hypothesis that, in the periodic form of this filariasis, microfilariæ hide themselves by day in just those positions to which a post-mortem flow of lymph would carry them. His hypothesis is left foundationless. On the other hand Prof. O'Connor, of Columbia University, reports that he has in fact demonstrated precisely that anatomical condition which must be found in female worms if periodicity is produced by their simultaneous parturition; and typical appearances of the worms at essential stages have been shown in London. As always in such cases his work must be repeated by others, but in the meantime theoretical objections by those who neglect to further this study cannot indefinitely be taken seriously. Analogies with *Dirofilaria immitis* are inexact and must not be given undue weight. The proper material for the study of this periodic filariasis of man is man with this periodic filariasis.

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AGRANULOCYTIC ANGINA

FOUR CASES TREATED WITH PENTNUCLEOTIDE

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E. J. Smith [1] recently enumerated ten cases of agranulocytic angina published in this country, and at the same time recorded one of his own which recovered. In the same number of THE LANCET J. H. Fisher [2] recorded two cases which ended fatally. The condition in all probability is much more common in this country than these figures would suggest, for I have myself met with four cases within ten months of each other, and I know of two others in this neighbourhood in 1934, both treated with Pentnucleotide and both ending fatally. All my cases occurred in private practice and all conform to Jackson's [3] essentials in the almost complete absence

of polymorphonuclear cells and in the red cells being normal or nearly normal; but in none of them were the platelets counted.

CASE 1.—A farmer, aged 47, was seen in consultation with Dr. C. W. Chaplin of Angmering on Feb. 3rd, 1934. He gave a history of having felt out of sorts for an indefinite time; certainly, he said, for months. On Jan. 25th, at a sale, he was told by a friend that he looked ill and ought to see a doctor. He was seen on Jan. 30th by Dr. Chaplin, who found him in high fever and sent him into a nursing-home, suspecting *Brucella abortus*. Agglutination tests by Dr. C. J. Harwood Little all were negative, but the latter took the opportunity to examine the blood further and his report on Jan. 31st was: "red blood-cells, 5,530,000 per c.mm.; hæmoglobin, 98 per cent.; colour-index, 0·89. No irregularities of size, shape, or staining of red cells. No nucleated red cells seen. There appears to be no deficiency of platelets. White cells, 860 per c.mm.; polymorphs 7 per cent., lymphocytes 76 per cent., monocytes 17 per cent. An occasional plasma cell was seen."

He had a swinging temperature, 98·8° and 103° F. having been the extremes, pulse-rate and respirations having varied with the temperature from 98 to 120 and 16 to 28 respectively. Of abnormal physical signs there were none, and he had no buccal or pharyngeal lesions. Bowels were inclined to be loose. Blood pressure was 112/74. That day he was started on 1 c.cm. doses of 5 per cent. sodium nucleinate solution, but there was delay in obtaining a supply of pentnucleotide which was substituted on Feb. 9th and administered intramuscularly in 10 c.cm. doses twice daily afterwards. On Feb. 8th Dr. Harwood Little reported: "total white cells, 100 per c.mm.; polymorphs 15 per cent., lymphocytes 69 per cent., monocytes 16 per cent. No abnormal leucocytes were seen. There is now some polychromasia of the red cells." The Wassermann reaction was strongly positive.

I saw him again on Feb. 10th. His general condition had deteriorated and he was now delirious at times. Blood pressure was 106/74. There were great irregularities in the temperature chart which was that of septicæmia or generalised tuberculosis, swinging from 98° to 103·6° F. Pulse- and respiration-rates were rising, especially the latter; but, as before, examination was negative; there was no enlargement of the spleen or lymphatic glands, nor any localised inflammation or necrosis. The diarrhœa continued. He went steadily downhill, the pyrexia became higher and more maintained, the maximum reading being 104·4° and he died on Feb. 15th. During the first nine days in the nursing-home he had been given two tablets of Allonal nightly containing amidopyrin grs. 3½ in each dose.

CASE 2.—Mrs. A, aged 51, was seen on March 2nd, 1934, in consultation with Dr. E. Wight. She gave no history of any previous illness or ill-health. On Feb. 23rd she had driven her husband from Byfleet to Brighton and had felt chilled on and after arrival. Next day she felt better and went out. On the 25th she felt ill again, was aching all over and thought she had influenza. Next morning her husband bought a thermometer and, finding that her temperature was up, sent for Dr. Wight, who had been seeing her daily since. Her temperature had varied between 101° to 104° F. The urine contained a trace of albumin and 3 per cent. of sugar, but there was no ketosis. A catheter specimen showed no pus cells and was sterile on culture. Examination of chest and abdomen revealed nothing abnormal. Her heart's action was rapid for an infection by the typhoid group, and with the last case fresh in my mind I advised agglutination tests and a blood count. We also inquired as to any localised painful sites or sores but she said she had none. There did appear to us to be general hyperæmia of the gums and throat, but all she complained of when questioned was dryness.

Dr. L. R. Janes saw her the same day. All agglutination tests were negative. On the blood he reported: "hæmoglobin, 79 per cent.; red cells, 4,125,000, and white cells, 1200 per c.mm.; colour-index, 0·96. Differential count: polymorphs 8 per cent., lymphocytes 80 per cent., monocytes 12 per cent. The red cells normal in shape, size, and staining reactions." On the following day, March 3rd, she was moved to a nursing-home and until March 8th she received 10 c.cm. pentnucleotide intramuscularly twice daily. On March 9th, 10th, 11th she had one injection daily and its administration was then stopped. She developed an acute vaginal abscess, of the early discomfort from which she had kept silent. A sinus gave trouble for a time but healing was complete when she was discharged on March 25th apparently quite well.

On March 7th Dr. Janes reported: "white cells, 12,200; polymorphs 72 per cent., lymphocytes 23 per cent., monocytes 5 per cent." And on March 10th: "white cells, 15,150; polymorphs 79 per cent., lymphocytes 15 per cent., monocytes 6 per cent." At this stage it appeared questionable whether the case was one of true agranulocytosis or was not rather an example of temporary neutropenia at the onset of an acute infection. The statutory interval had been left between the blood counts, but the response to pentnucleotide seemed altogether too dramatic.

Dr. L. G. Higgins of Woking kindly informed me that after her return home she developed pelvic peritonitis high up in the left broad ligament and also a rather severe left pyelitis. The pain and pelvic cellulitis lasted three weeks and the pyuria two months. On May 6th a blood count showed: red cells, 4,700,000 per c.mm.; Hb., 80 per cent.; C.I., 0·85; white cells, 5800; polymorphs 64 per cent., lymphocytes 15 per cent., monocytes 17 per cent., eosinophils 3 per cent., and basophils 1 per cent. During the early summer the patient appeared to be in good health, and in July she went away to stay with friends. She returned home on July 18th saying she had been feeling out of sorts for a day or two. Her temperature was 102°, she had a tender inflamed pile, and there was pus in the urine again. The blood count showed: red cells, 3,600,000; white cells, 400; Hb., 75 per cent.; C.I., 1·0. All the white cells were lymphocytes. On July 19th she was given two doses of pentnucleotide 10 c.cm. each. The following day she was much worse, her mouth was ulcerated, and she had a sloughing vaginitis; temperature 103°, heart's action rapid and feeble. On that day she was given 40 c.cm. pentnucleotide. On July 21st her condition had still further deteriorated. In the morning she had 20 c.cm. pentnucleotide. She died suddenly at midday.

CASE 3.—Mrs. B., aged 29, was seen on April 20th, 1934, with Dr. Victor G. Williams of Eastbourne, to whom I am indebted for particulars of her history and the earlier facts of her illness. For eight years she had been subject to febrile attacks with sore-throat and swollen tender gums. In 1930 she was operated on for acute cholecystitis and at the same time a chronically inflamed adherent appendix was removed. She subsequently had a course of mixed streptococcus vaccine from organisms found in a tooth and in the fæces. A blood count that year showed: red cells, 4,750,000; white cells, 5000; polymorphs 51 per cent., lymphocytes 49 per cent. In 1933 she had been in good health until the autumn, when she had the last of her earlier febrile attacks and, after further dental extractions in December, she had from January to March, 1934, another course of *Streptococcus viridans* autogenous vaccine which produced no reactions.

The present illness began suddenly at 2 A.M. on March 30th with a rigor, vomiting, and general aching. When seen her temperature was 101·5°, she was sweating profusely, but objective examination revealed no more than redness of the fauces and swelling of the nasal mucosa. On March 31st she had a second rigor. On April 3rd Dr. J. Bodkin Adams saw her with Dr. Williams and found no abnormal physical signs except that by that time she had a boil of the external auditory meatus. Fever persisted up to 103·2° and on April 11th the nose and nasal sinuses were examined by Mr. D. E. O'Connor Cuffey with negative results. On April 9th she was given an injection of Omnadin and on April 10th and again on the following day she was given 15 c.cm. antiscarlatina serum intramuscularly without any effect upon the pyrexia which was now of pneumonic type. On April 12th Dr. A. G. Shera reported that the white blood-cells numbered 1600 per c.mm., and of these 16 per cent. were polymorphs, the remainder being lymphocytes. He also found hæmolytic streptococci in culture made from a throat swab. That evening her temperature rose to 104·4° and she had another rigor. On April 13th 2 c.cm. injections of nuclein were started and a sensitised vaccine from the throat streptococci, the initial dose being 100 millions,

On April 16th Dr. Shera reported white cells down to 800. lymphocytes 99 per cent., basophils 1 per cent.; no polymorphs were seen. That day she had her first injection of pentnucleotide 10 c.cm., and these were continued twice daily onwards. By now the patient was delirious at times, lumbar puncture was performed, but examination of the cerebro-spinal fluid yielded nothing of interest and there was no improvement in her symptoms. A catheter specimen of urine was sterile. The throat remained much the same but phlegmonous ulcers formed on the gums, there was severe glossitis, the face swelled, and she developed minute pustules on the skin. The sensitised vaccine which had been pushed up to 2000 million doses was discontinued after April 19th.

I saw her with Dr. Williams the following morning. She was then a pitiable sight. All along the gums were sloughs, and her lips were swollen and scabbed. She could hardly open her mouth and there was great fœtor of the breath. The right eye was closed by hæmorrhagic œdema of the upper lid. There were discrete pustules and punctate petechiæ dotted over the body, and a profuse morbilliform rash over the left upper limb. Blood pressure was 98/66, hæmoglobin 45 per cent. The heart was beating rapidly and feebly but there were no murmurs or pericardial friction, and the chest was clear except for a few crepitations at the right base. There was no enlargement of the spleen. In two blood films I made Dr. Janes could not find a single polymorphonuclear leucocyte.

On April 21st she had a blood transfusion of 500 c.cm. Dr. Shera reported on that day: "red cells, 2,800,000; Hb., 40 per cent.; white cells, 1000 per c.mm., all of them being lymphocytes." She died on April 22nd, the twenty-fourth day of her illness.

CASE 4.—Miss C., aged 25, had never been robust but had not suffered from any serious illness. Following trouble from an impacted wisdom tooth she had had a series of sore-throats, and on May 24th, 1934, her tonsils were enucleated by Mr. D. A. Crow, after which she had a normal convalescence and no return of the sore-throats. On Oct. 29th she developed an ulcer on the tongue after general aching pains the day before. These pains continued, and on the 31st, finding that her temperature was 101°, she called in Dr. C. C. Elliott of Seaford. From that time onwards she was kept in bed. The lingual ulcer quickly healed, but she developed another on the hard palate which was touched with solid silver nitrate. The aching and fever continued, temperature varying between 99·4° and 104°, she complained of pain on swallowing anything hot, from time to time the glands in the neck were swollen and tender, and on Nov. 5th she developed a third ulcer, this time on the lower lip. The following day Dr. Janes saw her at her home and reported as follows: "hæmoglobin, 71 per cent.; red cells, 3,540,000 per c.mm.; C.I., 1·0; leucocytes, 1000. Differential count: polymorphs 2 per cent. (20 per c.mm.), lymphocytes 92 per cent. (920 per c.mm.), monocytes 6 per cent. (60 per c.mm.). In the stained films the red cells are practically normal in shape, size, and staining reactions."

Dr. Elliott then had her moved to a nursing-home in Hove, and that evening, Nov. 6th, I saw her and she had her first dose of 10 c.cm. pentnucleotide. On admission temperature was 103°, P. 104, R. 22. She had an active ulcer on the lower lip, there was blackening from the silver nitrate at the site of the ulcer on the hard palate but no inflammation around, and the lingual ulcer had healed and its site was unidentifiable. There appeared to be some swelling of the gums but they were not painful and there had been no bleeding. She complained of her throat hurting her when she swallowed, but nothing abnormal was visible. Her general condition was definitely good, the history was short, the local lesions were slight, and it seemed that hers was a case which on pentnucleotide was likely to do well. Unfortunately it did not.

The mouth gave no trouble and there was no difficulty about her nourishment, although all along she complained to some extent of sore-throat without any objective evidence of the cause of such. The palatal ulcer healed, but that on the lip remained open but it did not spread and as the days went on she said it hurt her less. No fresh lesions developed, the cervical glands went down, and she completed what her nurses described as an ordinary normal period. General aching was the prominent symptom. On Nov. 8th and 9th four consecutive temperature readings were 104·2°, 103·2°, 102°, and 99·4°, the pulse fell from 108 to 88, respirations from 24 to 20, and she said she felt "quite different" in herself, but the next three readings were 104·2°, 106°, and 106·2°, and for the next 24 hours the temperature was 105°–106° except when she was sponged.

On Nov. 10th Dr. Janes reported on blood taken the previous day: "red cells, 3,280,000 per c.mm.; Hb., 68 per cent.; C.I., 1·04; white cells, 800 per c.mm.; lymphocytes 70 per cent., monocytes 30 per cent. In the stained films the red cells are normal in shape, size, and staining reactions." That day the dose of pentnucleotide was increased to 30 c.cm., and on Nov. 11th she was given 40 c.cm. She lost flesh rapidly but the hyperpyrexia was accompanied by no delirium, she was able to take fluid nourishment in adequate amount, to wash out her mouth, and appeared in no way to realise the gravity of her condition. On the 10th her respiratory rate touched 30 for the first time and I went over her chest again without finding anything abnormal. During that night, however, she complained for the first time of pain in the right side and examination next morning revealed a wide area of pleuritic friction. That day she had her third and last blood count from Dr. Janes: "red cells, 3,180,000; Hb., 55 per cent.; C.I., 0·87; white cells, 300; lymphocytes 55 per cent., monocytes 45 per cent." Blood grouping was also performed with the idea that next day as a last resort she should have a transfusion from a donor with an artificially produced leucocytosis. But she died at 8 o'clock the following morning.

Each of these cases presents points of interest.

Case 1 was only diagnosed so early because the clinical pathologist went beyond the specific tests asked for. At no time during the course of his illness had this patient's symptoms any anginal element. Ordinary nuclein was employed at first, but he had six clear days' treatment by pentnucleotide before the day he died. He is the only one of the series who had taken amidopyrin, and the agranulocytosis was well established the day after the first dose. Its exhibition for a short time in small doses was merely an incident in his case, nor had, I imagine, the positive Wassermann reaction any ætiological relation.

In Case 2 the suggestion that agranulocytosis might be present was tentative and far-fetched, the pathologist's report on the day she was seen was a surprise, and the improvement in her blood picture was so rapid and so startling as to suggest the vis medicatrix naturæ rather than a response to specific treatment. Unfortunately events proved the contrary.

Case 3 gives the typical picture. Interesting features about her are the earlier attacks of sore-throats and swollen gums, and it is of particular interest that in her we know that four years previously she had both an absolute and a relative neutropenia. There was a long history of ill-health, yet the onset of her fatal illness was by so sudden an invasion that it could be timed and occurred when she was feeling well. To begin with her clinical picture was that of a severe general infection, the local lesions appeared later. She, like Case 1, had received twelve 10 c.cm. doses of pentnucleotide before the day she died.

Case 4 was a profound disappointment. The diagnosis was made early, the local lesions were slight, and her general condition was good when the pentnucleotide was started. Again six days elapsed between the first injection and the day of her death, and in that time she received a total amount of 140 c.cm. Yet hers was the most malignant case of all—the only one which showed hyperpyrexia—and with trifling local lesions she was dead in less time than Case 3 with her sloughs and hæmorrhages.

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A CASE OF NEOPLASTIC DISEASE BELONGING TO THE HODGKIN GROUP

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A locomotive driver, aged 36, was admitted with "lumps in the neck" to the Royal Northern Hospital under the care of one of us (C.) on June 27th, 1931. Nine months previously a lump had appeared in the left root of the neck and another higher up. These had gradually disappeared. In January, 1931, another gland had appeared on the same side. This was removed at Tilbury Hospital and was said, on microscopic examination, not to be Hodgkin's disease. Shortly afterwards he had a sore-throat, felt very weak and lost weight, and glands appeared on both sides of the neck. He became steadily worse until admission.

PHYSICAL STATE AND COURSE OF ILLNESS

On admission to the Royal Northern Hospital he was pale and looked very ill. His temperature was normal, his pulse-rate 120, and his urine normal. Numerous enlarged, freely movable, smooth, and discrete glands were found in the anterior and posterior triangles of both sides of the neck, both axillæ and groins, and deep in the left iliac fossa; also a few glands in both antecubital fossæ, the right epitrochlear region, and the scalp. A skiagram of the chest showed large masses (? glands) at both hila and in the right superior mediastinum. The teeth were carious and the gums heavily infected. The tonsils were large and inflamed.

The heart was not appreciably enlarged, but had a feeble action. There was hypostatic congestion of the bases of the lungs, also considerable œdema of the feet, legs, and lumbosacral region, and a moderate degree of ascites. The liver was moderately enlarged, regular and firm, but not tender. The spleen was enlarged to 2–3 inches below the costal margin; its surface was regular and smooth.

A blood count on June 29th showed: 3,000,000 red cells; hæmoglobin, 58 per cent.; colour-index, 0·96; and 2400 white cells with a normal differential count. There was polychromasia ++, but otherwise nothing abnormal. The blood condition gradually became worse and on August 26th it was as follows:—

Red cells ..	2,200,000	Polymorph ..	50%
White cells ..	1,500	Lymphocyte ..	41%
Hæmoglobin ..	36%	Eosinophil ..	5%
Colour-index ..	0·81	Large mononuclear ..	4%

There were 15 nucleated red cells per c.mm. and 4 per cent. of reticulocytes.

The Wassermann reaction on July 2nd was doubtful (±). The report on a gland removed from the right epitrochlear region on July 7th read: "The glandular structure is entirely replaced by new growth, probably a true endothelioma. Cell division is active." On a submaxillary lymphatic gland removed on July 21st the report was: "Structure similar to previous specimen."

Concurrently with increasing anæmia, in spite of vigorous treatment with iron and arsenic and some X ray applications to the glandular enlargements, he got weaker and more waterlogged. A course of Salyrgan injections was given intravenously and the X ray treatments continued. Gradually all œdema and ascites disappeared and the glandular swellings began to subside. He had, in all, eleven X ray treatments (given by Dr. E. Hope at the Royal Northern Hospital) within three months. Soon after beginning the X ray therapy he had also seven daily subcutaneous injections of Coley's fluid (♏ ½, increasing to ♏ 4). He made rapid progress, so much so that he left the hospital on Nov. 14th, 1931, much improved in every way. Dr. R. Gethen, his doctor at home, wrote: "The man looks a new creature." The glands were greatly reduced in size, there was no œdema, while the appetite and sleep were good. The liver and spleen were unaltered in size. A blood count shortly before discharge showed 4,000,000 red cells; hæmoglobin, 70 per cent.; colour-index, 0·8; and 5000 white cells.

The patient was fit for four months and was at work as a locomotive driver for three of these months. Then weakness and swelling of the glands began to return and seven months after leaving hospital he was admitted to the National Temperance Hospital (May 27th, 1932), again under the care of one of us (C.).

The patient, as before, was very pale and ill-looking. He perspired freely and was extremely weak. Lymphatic glands were considerably enlarged behind the ears, at the angles of the jaws, the root of the neck, and in the axillæ and groins; also in the left iliac fossa and higher up in the abdomen on both sides. There was slight ascites and slight œdema of the legs. The heart was very weak. The lungs were normal apart from some hypostatic congestion of their bases. The tonsils were enlarged and chronically infected. The urine was normal.

He died on June 13th, 1932, 17 days after admission. For the first six days the temperature touched 99° F.; from then until death it was subnormal. The pulse-rate varied from 94 to 130, and the respiration-rate from 20 to 26. Apart from some increase in red cells and hæmoglobin there was no apparent response to treatment; on May 28th the red cells numbered 2,540,000 and the hæmoglobin was 50 per cent.; on June 10th the red cells were 3,230,000 and the hæmoglobin 70 per cent. The leucocytes were 6000 on admission, but just before death 24,000, of which 83 per cent. were polymorphonuclears (an inflammatory leucocytosis); no eosinophils were found.

POST-MORTEM EXAMINATION

Body well nourished. Greatly enlarged glands present behind the ears, at angle of jaw, and in neck. Inguinal and femoral glands also much enlarged, but no obvious enlargement of mediastinal glands. Lungs and heart were normal. Liver much enlarged with plum-coloured bosses of growth, some as large as plums, projecting all over the surface and studded throughout the organ. Although not encapsulated, these masses were definitely circumscribed, not infiltrating the liver tissue. Gall-bladder encased in granulomatous or neoplastic tissue, not involving mucous membrane. Spleen greatly enlarged and studded with nodules as in the liver. Retroperitoneal lymphatic glands much enlarged, as also those at hilum of liver and spleen, the whole mass projecting on surface of abdomen. Glands were bound, but not fused, together, so that on section the outline of each gland could be separately distinguished. Cut surface of glands and nodules in liver and spleen were

FIG. 1.—Lymphatic gland: in the upper part (and to the left) are seen the lymphocytes much reduced in number, and increased reticulum. In the lower part (and to the left) these are replaced by endothelial cells (× 70).

plum-coloured. The upper fourth of the left femur was removed and bisected longitudinally: the cancellous tissue in the head and trochanter had a mottled appearance with large yellowish-white and red patches. At the junction of the red and yellow marrow there was a large metastatic deposit, the upper portion of which was hæmorrhagic. Nothing abnormal was detected in the alimentary canal.

HISTOLOGY

Lymphatic glands.—Little of normal appearance remains. Lymphocytes, except at the periphery, have been replaced by large endothelial cells, so that neither cords nor follicles can be distinguished. In large areas endothelial cells form a continuous mosaic with a few lymphocytes scattered among them, but syncitial cells are not present, and in the more peripheral regions individual cells can be readily distinguished—polyhedral or elongated, the result of pressure, for in the peripheral sinuses they are spherical. The large vesicular nuclei surrounded by scant protoplasm stain moderately deeply and many show mitotic figures. While follicles and cords can no longer be distinguished, the sinuses filled with endothelial cells are more easily made out than in the normal gland, clearly showing their circular structure at the periphery and elongated or moniliform appearance in the more central area. A few of the endothelial cells are much larger than the rest and closely resemble the Sternberg cells of Hodgkin's disease. An occasional multinucleate giant cell of the same type can be distinguished. In most of the section very little reticulum

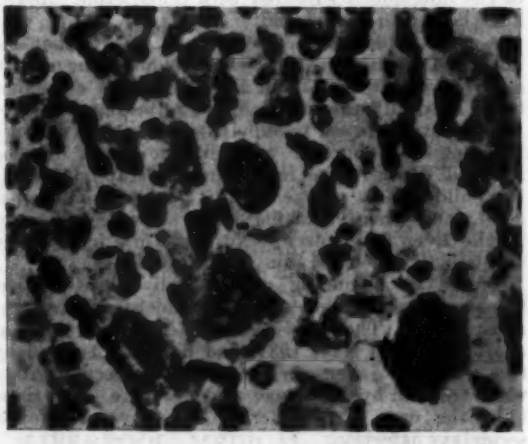

FIG. 2.—A more highly magnified portion of (1) showing giant cells in the midst of endothelial cells (× 450).

is present, the cells being closely apposed, but in some parts the reticulum is clearly seen and has even undergone hypertrophy. The alveolar arrangement of the endothelial cells in the midst of this reticulum gives an appearance closely resembling an alveolar carcinoma. In some glands there is considerable extravasation of blood. Endothelial cells have not infiltrated the capsules of the glands.

Spleen.—The superficial metastatic deposits in the spleen exhibit the same structural arrangements as in the lymphatic glands. Lymphocytes are completely replaced by large endothelial cells and no follicles are present.

Liver.—Metastatic deposits similar to those in the spleen. Hepatic tissue appears to be passively displaced rather than infiltrated, yet at the circumference of the deposit some islands of necrosed liver cells are present, surrounded by endothelial cells.

Gall-bladder.—Macroscopically normal but completely encased in granulomatous tissue. Microscopically no involvement of mucous membrane or fibromuscular wall, but outside the latter there is a thick layer of endothelial cells similar to those in the glands.

Metastatic deposit in the *bone-marrow* showed a similar endothelial structure, but lymphocytes were present in larger numbers than in the other metastatic deposits.

FIG. 3.—Spleen, showing the same replacement of lymphocytes by endothelial cells (× 70).

DISCUSSION

In diagnosing the condition the following diseases had to be considered: Hodgkin's disease, lymphatic leukæmia and a group of diseases eluding a dogmatic classification but described as endothelioma of lymph glands,[1 2] lymphosarcoma (Kundrat's [3]), and Hodgkin's sarcoma.[4] The post-mortem findings with the peculiar metastatic deposits in liver and spleen exclude ordinary Hodgkin's disease. Lymphatic leukæmia was excluded by the blood picture and by the histological structure of the glands, so that one must place this case in the third group. The histological structure of the affected tissues bears a close resemblance to that of endothelioma of the lymph nodes described by Ewing [1 2] and by Pilcher,[5] and to that of the condition somewhat unfortunately called Hodgkin's sarcoma.

No more can be safely maintained than that the lesions suggest a neoplastic condition of the reticulum cells such as is found in this third group of cases, which have this in common: that many of the cases originate in an infective process and that in others such an origin seems probable. Moreover, as Pilcher,[5] speaking of the spread of the glandular involvement, states: "There appears to be an essential change in the gland with no suggestion of cellular metastasis from adjacent foci." Ewing [4] has expressed similar views. Mervyn Gordon [6] and his co-workers, although they have not yet succeeded in reproducing lymphadenoma in animals, have brought forward evidence that a thermostable virus is the causative agent of the disease, and perhaps work on these lines may establish the ætiological relationship, which may be very close, of the members of this third group.

It is possible that a further study of these ill-defined diseases may have an important bearing on current theories of the origin of cancer, and support the views of those who postulate a parasitic or virus factor in the production of this disease.[7]

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THE PREVENTION OF SECONDARY INFECTION OF TUBERCULOUS JOINTS

WITH SPECIAL REFERENCE TO IMMUNISATION WITH DICK TOXIN

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Treatment according to the accepted principles is the chief means of preventing secondary infection of tuberculous joints. Prolonged recumbency in the open air, proper splintage, skilful aspiration of abscesses, and asepsis in dressing sinuses are the chief of these, and in the large majority of cases produce healing of the disease. In a few, however, these measures fail. The abscess reaches the skin, secondary infection occurs, and a process of acute followed by chronic suppuration is started which may end in amyloid disease and death. Secondary infection is the chief menace to the lives of patients suffering from joint tuberculosis; its prevention is the chief anxiety of those entrusted with their treatment.

The following experience at Black Notley Sanatorium may be of value in indicating accessory methods of treatment which so far as can be ascertained have had the effect of reducing considerably the incidence of secondary infection among patients under treatment. The methods referred to are incision, curettage, and resuture of the abscess before it reaches the skin, when it can no longer be controlled by expiration, and possibly immunisation of children suffering from joint tuberculosis with Dick toxin.

The former method is well known but has only been used by me during the last three years. Seven cases in which the abscess threatened to point have been treated by this method since the beginning of 1932. In one case (L. O. Group II, Case 3) virulent secondary infection followed later. The value of this method is due to the fact that large masses of granulation tissue, which form a nidus for the organisms of secondary infection, are curetted away before infection has occurred. A sinus often forms after the operation, but this is less liable to become infected than an abscess infiltrating the skin and subcutaneous tissues.

The second method, that of immunisation of children, suffering from joint tuberculosis, with Dick toxin, is reasonable when it is considered that a hæmolytic streptococcus may be found in virulent cases of secondary infection. Staphylococcal infections produce prolonged suppuration and amyloid disease, but in the following small series of cases they have not proved to be a potent factor. The value of this method is sub judice. It is difficult to assess to what extent each method has contributed to the reduction in the incidence of secondary infection.

OBSERVATIONS IN THE SANATORIUM

The wards for children suffering from bone and joint tuberculosis were opened in July, 1930. During the following eight months two mild epidemics of scarlet fever occurred. In April, 1931, Dr. W. A. Bullough, the county medical officer of health, advised that all children admitted to the sanatorium should be Dick-tested, and the positive reactors immunised against scarlet fever with Dick toxin. From May, 1931, all Dick-positive children were immunised except those who had recently had scarlet fever. Since then only one case of scarlet fever has occurred. From July, 1930, to May, 1931, 42 cases were under treatment. Of these, four developed virulent secondary infection which in three cases led to advanced amyloid disease. This incidence of secondary infection was above the average and it is possible that it was partly attributable to extraneous factors. In addition, since May, 1931, there have been several boys treated in the men's ward who were not immunised. Of these, two developed secondary infection: one healed, the other still has suppuration (I. N. Group IA, Case 2).

Eighty-eight cases have been under treatment in the children's wards since May, 1931. The incidence of secondary infection in this group has been very small. Two children were admitted with secondary infection: one Dick-immunised child developed a mild infection which healed well after incision. The only virulent infection occurring after admission was in a child (L. O. Group II, Case 3) who developed a hæmolytic streptococcal infection of the hip. The hip was œdematous on admission and there were fluctuation and slight fever. Aspiration and then curettage and resuture were done and a course of Dick toxin given. A month after the last dose acute infection occurred. It is doubtful if immunity had at that time developed. In spite of the virulence of the infection it subsided with remarkable rapidity and the child remains well.

A comparable case (I. N. Group IA, Case 2) that had not had Dick toxin and which developed a hæmolytic streptococcal infection about the same time continued to go downhill when this child was healing.

One patient (C. F. Group IIA) in whom secondary infection was present on admission did develop amyloid disease; the infection was staphylococcal; the child is now recovering, his general condition is good, and there remains only some enlargement of the liver and spleen. No case, not infected on admission, developed amyloid disease.

From the beginning of 1932 all abscesses that threatened to point were treated by incision, curettage, and resuture. The three cases that developed amyloid disease prior to May, 1931, had not been treated by this method. Seven of the cases in the second group were treated by curettage and resuture. Of these only the case L. O. referred to above developed secondary infection.

The following is a summary of the cases:—

Group I.—Cases that became secondarily infected in children's wards prior to introduction of immunisation with Dick toxin or treatment by curettage and resuture. Cases under treatment, 42. Cases of secondary infection, 4. Cases of amyloid disease, 3.

Group IA.—Two cases of secondary infection among several boys treated in the men's ward, not immunised or treated by curettage and resuture.

Group II.—Cases that became secondarily infected after admission to children's ward, subsequent to introduction of Dick-toxin immunisation and curettage and resuture. Cases under treatment, 88. Cases infected, 3. No cases of amyloid disease.

Group IIA.—One case infected on admission, developed amyloid disease but is recovering.

PARTICULARS OF SECONDARILY INFECTED CASES

GROUP I

Case 1.—O. R. Admitted July, 1930, with psoas sinus. Infection with high temperature in September, 1930. Psoas abscess opened and drained. Bacteriological report: streptococci. Discharged well. Sinuses healed.

Case 2.—K. B. Admitted July, 1930, with advanced hip disease. In September developed mild scarlet fever. Abscess broke down in November. Virulent infection occurred in January, 1931. Several operations for drainage

Bacteriological report: staphylococci. Bacteriological report from sinus, October, 1931: streptococci. Amyloid disease developed May, 1932. This boy was not immunised in 1931 as he was presumed to have been protected by his attack of scarlet fever.

Case 3.—L. S. Admitted November, 1930, with advanced hip disease. Abscess broke down and became infected in March, 1931. Operations for drainage. Bacteriological report: hæmolytic streptococci. Two doses of toxin given after the incidence of the infection. Case progressed to amyloid disease.

Case 4.—B. V. Admitted January, 1931. Hip became infected February, 1931. Developed amyloid disease which progressed. No bacteriological report.

GROUP Ia

Case 1.—R. V. Admitted June, 1932, to adult ward with tuberculous spine, and sinus from psoas abscess. Secondary infection occurred March, 1933. Operation for drainage. No bacteriological report. Discharged with sinuses healed.

Case 2.—I. N. Admitted in June, 1933, after excision of tuberculous hip. Result thought to be good. Discharged after three months. Readmitted March, 1934, with recurrence of hip disease. Multiple abscesses developed under scar soon after admission. Secondary infection occurred and became virulent. Several operations to drain. Bacteriological report: hæmolytic streptococci. Fever continued and condition deteriorated. 13 c.cm. of anti-scarlatinal serum on August 1st, 1934. Dick-toxin injections July–August, 1934. The prognosis in this case appeared to be bad but there has been improvement recently.

GROUP II

Case 1.—K. V. Admitted November, 1932, with tuberculous knee. Dick positive. Immunised January, 1934. Mild infection of abscess of knee occurred in February, 1934. Abscess opened and drained. Bacteriological report before infection: tubercle bacilli. No report after infection. Sinus healed after three months.

Case 2.—R. B. Admitted July, 1931, with tuberculous disease of hip, abscess, and fever. Clinical appearance of infection. Incised and drained. Bacteriological report: cultures sterile. Temperature subsided. Report from pus from sinus in October: staphylococci. Dick immunisation in April, 1932. Discharged in December, 1932. Sinuses healed.

Case 3.—L. O. Admitted February, 1934, with tuberculosis of the left hip, with abscess. Œdema present, slight fever. Bacteriological report following aspiration showed T.B. cultures sterile. On March 27th curettage and resuture as abscess was pointing. Cultures again sterile. Dick-toxin immunisation March–April, 1934. On April 24th there was still slight fever and induration was present. On May 24th temperature 103°, infection virulent. Following several operations for drainage, hæmolytic streptococci were found. The infection appeared to have become established but recovery took place with unexpected rapidity. General condition now good. In July temperature normal, sinuses healing rapidly. In October sinuses healed. The unexpectedly rapid healing may have been due to the artificial establishment of immunity.

GROUP IIa

C. F. Admitted April, 1931, tuberculous left knee with sinuses, clinically secondarily infected. Two months later onset of tuberculosis of right knee. Dick negative. Staphylococci found in sinuses from knees. Also T.B. from right knee. Wassermann reaction negative. Liver and spleen became large, and child presented amyloid appearance, but condition improved later, and is now excellent.

It will be noted from the above that out of 10 infected cases, the bacteriology of the most virulent was as follows:—

L. S. K. B.	Advanced amyloid disease.	Hæmolytic streptococci. Staphylococci, followed by streptococci and *B. pyocyaneus*.
B. V.		No report.
C. F.	Amyloid disease aborted.	Staphylococci.
I. N. L. O.	Virulent infection.	Hæmolytic streptococci.
O. R. R. V.	Infected psoas abscess.	Streptococci. No report.

SUMMARY

If aspiration fails, incision, curettage, and resuture of abscesses before the advent of secondary infection is of extreme importance. (2) The possible use of Dick toxin for the prevention of virulent secondary infection deserves further investigation.

MEDICAL SOCIETIES

LIVERPOOL MEDICAL INSTITUTION

AT a meeting of this institution on Nov. 29th, with Dr. J. MURRAY BLIGH, the president, in the chair, a paper on the

Parathyroid Glands

with particular reference to their growth-retarding functions, was read by Dr. T. LLOYD HUGHES. The work of Thompson and Robinson in 1931, he said, had led to a study of the possible relationship between the parathyroid oxyphil cells and the growth-retarding hormone. In his own investigation the parathyroid glands were removed post mortem in 200 cases, and were examined for numerical, anatomical, and histological variations. The oxyphil cells content of all the glands was numerically computed according to a method modified from the one used by Rasmussen in counting the oxyphil cells of the anterior lobe of the pituitary. It showed a more or less regular increase with age, but in cases of malignant disease the number was reduced below the normal for the age-period. This reduction might indicate an absence of growth-retarding hormone—a deficiency which might allow of malignant hyperplasia if the necessary stimulus was forthcoming. Thus it was possible that the oxyphil cells had a special function related to the growth-retarding factor isolated from the parathyroids, and were not, after all, degeneration products of the principal cells.

At a meeting held on Dec. 6th, with Dr. J. MURRAY BLIGH, the president, in the chair, a paper on the use of

Antistreptococcal Serum in Certain "Rheumatic" Affections

was read by Dr. ROBERT COOPE and Dr. F. PYGOTT. They prefaced their remarks by a quotation from one of Trousseau's clinical lectures: "When a patient runs an imminent risk, it is justifiable, or at least it is excusable, to use every remedy, as in such a case we cannot make bad worse. Still, even in such cases, our therapeutic action must be defensible in theory and by an appeal to analogy." They presented for consideration a series of nine recent cases in which they had felt driven by clinical necessity to try the effect of antistreptococcal serum. One patient, a middle-aged man, had a post-scarlatinal non-suppurative arthritis of the hip-joint, which did not improve with immobilisation and heavy dosage with salicylate; intramuscular injection of 20 c.cm. of scarlatinal antitoxic serum

was followed by rapid recovery. The remaining eight patients, all adults, were seriously ill with acute polyarthritis, and in all but one there was a clear history some 9 to 12 days previously of severe "sore-throat." In four of them the illness was associated with erythematous nodules in the skin; they were patients whose ages varied from 43 to 52, and there was no evidence of active tuberculous infection. Their erythema nodosum was but an incident in a generalised severe "acute rheumatism" which did not improve on intensive treatment by salicylate. They all responded quite dramatically to one or two doses of serum (in two cases scarlatinal antitoxin was used, in the other two cases polyvalent streptococcal antitoxin). Of the other cases, one was desperately ill and incontinent, but after the injection of 20 c.cm. of the polyvalent serum on two successive days he was greatly improved and went on to full recovery. In another patient, a woman of 35 who at the time she fell ill was actually waiting to be admitted for removal of unhealthy tonsils, the acute polyarthritis was complicated first by a toxic nephritis and later by double basal pneumonia. Blood culture revealed a non-hæmolytic streptococcus, and two doses of 20 c.cm. polyvalent antistreptococcal serum were given. The general condition improved, but she then developed an intense urticaria and serum sickness and nearly died. After that, however, the temperature fell to normal and she slowly recovered.

The remaining two patients were not quite so gravely ill. One young man, in spite of treatment and the disappearance of his fever, had a series of relapses of the arthritis. Three days after a single injection of 20 c.cm. of scarlatinal antitoxin the pain and swelling of the joints subsided, and there were no further relapses. Another patient, seriously ill with polyarthritis and pericarditis, improved temporarily after 30 c.cm. of serum, but later had a series of relapses, involving the throat and joints. Looking back on the case, they felt that at the time they lacked confidence to repeat the injection and should have done so. In all the cases treatment by large doses of salicylate was ineffective. In the light of these experiences Dr. Coope and Dr. Pygott suggested that whatever may be the effective mechanism of recovery, whether specific or non-specific, the use of serum treatment in similar cases was worthy of trial.

Sterility due to Ovarian Dysfunction

Mr. T. N. A. JEFFCOATE read a paper based on the records of 654 patients complaining of sterility of at least two years' duration. No abnormality of any kind was found in 17·3 per cent. of the cases, while 12·3 per cent. had no gross lesion but complained of some menstrual upset—in addition to sterility. Mr. Jeffcoate thought that the poor results attending treatment of this condition are due to failure in the diagnosis of the underlying cause, which often lay in some physiological upset in the ovary. All menstrual disturbances, apart from epimenorrhœa, were characterised by absence of or infrequent ovulation; hence the sterility encountered in patients presenting these symptoms. Examination of premenstrual curettings from 63 patients who had regular uterine hæmorrhage (but did not necessarily complain of sterility) showed that about 25 per cent. exhibited anovular menstruation. This condition was probably even more prevalent in patients complaining of sterility. Curettage during the premenstrual or menstrual phases was an essential part of the investigation of sterility, for in this way anovular menstruation should be recognised. Mr. Jeffcoate concluded by outlining a method of treatment of this type of ovarian dysfunction.

In the discussion which followed, Mr. M. DATNOW said there could be no doubt that insufficient stress had been laid on dysfunction as an ætiological factor in sterility; this was evidenced by the common lay fallacy that a woman is most fertile just after and just before menstruation, instead of during the middle fortnight of her cycle. The fact that menstruation could occur without ovulation (anovular cycle) had been recognised (although controverted) for some considerable time. In rabbits not infrequently the follicles did not rupture and pseudo-pregnancy ensued, with all the uterine and general changes of pregnancy, terminating with lactation about 17 days after œstrus. Mr. Datnow spoke of the importance of inquiring carefully into the menstrual history of every patient who complained of sterility. The time of follicular rupture was fairly constant for any particular person and he had frequently been told by patients that they always became pregnant on or about the same day of their cycle. This made him advise his patients, who sought advice for their sterility, to resort to coitus during different weeks of the cycle each month. He pointed out the importance of correlating the ovarian picture with the histological findings in the endometrium. In patients suffering from dysfunction and irregular menstruation, there was no doubt that one could see histological appearances illustrative of all the phases of the endometrial cycle in any one uterus. He was not convinced that curettage and examination of the curettages would be of any more value than merely to prove that there was dysfunction. He felt that it was more important to make an analysis of the hormonal content of the blood and urine in those cases of *sterility with dysfunction*, which really only formed a very small proportion of the total, in order to determine those hormones that were in excess or lacking so that the appropriate treatment could be applied. It was the absence of a fertilised ovum rather than the presence of a new "hormone Z" (suggested by Mr. Jeffcoate) which precipitated the menstrual flow.

PEOPLE'S LEAGUE OF HEALTH.—At the annual general meeting of this organisation, held in London on Dec. 12th, Dr. C. O. Hawthorne, the chairman of council, referred particularly to the League's endeavours to secure not only a clean but a safe milk-supply. It had pressed forward the various points set out in its report on Bovine Tuberculosis published in 1932, and had supplemented it by authoritative memoranda to the Ministers of Health and Agriculture. To one proposal of the Milk Marketing Board the League had taken the strongest exception—namely, the Accredited Herd and Producers' Milk Scheme. "Accredited" milk might claim to be "clean"; it certainly could not claim to be "safe." Miss Olga Nethersole, founder and hon. organiser of the League, spoke, among other activities, of the health talks and lectures given in prisons. In dealing with future developments Dame Louise McIlroy suggested that the League might appropriately furnish a liaison between the public and the medical world on the question of the nutrition of expectant and nursing mothers as affecting maternal mortality and morbidity. She felt that malnutrition was one of the fundamental causes of maternal mortality and the cause of many diseases and accidents of pregnancy. Sir Leonard Hill cordially supported this proposal and also spoke in support of a scheme for the establishment of national boarding-schools to which children from overcrowded slum districts might be sent on medical recommendation. Sir Pendrill Varrier-Jones mentioned that at Papworth, where the diets advocated by nutritional experts were followed, the medical officers had lost no child or mother in childbirth.

REVIEWS AND NOTICES OF BOOKS

Atlas of the Commoner Skin Diseases

By HENRY C. G. SEMON, M.A., M.D. Oxon., M.R.C.P. Lond., Physician for Diseases of the Skin, Royal Northern Hospital. Photography under the direction of ARNOLD MORITZ, B.A., M.B., B.C. Cantab. Bristol: John Wright and Sons, Ltd.; London: Simpkin Marshall Ltd. 1934. Pp. 219. 42s.

SOME years ago a questionnaire addressed to past members of the Fellowship of Medicine inquiring in what subjects they were most interested brought replies showing dermatology an easy first. This might be interpreted as revealing a dark spot in undergraduate medical education. The system of instruction has got somewhat out of focus. If the practitioner finds when he embarks on his career that he is imperfectly equipped to diagnose and treat a number of "minor" conditions, of which skin diseases form a considerable proportion. For if these do not threaten life they do prevent the patient from working and maintaining his position in the economic structure. Dr. Henry Semon and Dr. Arnold Moritz have here gone a long way towards meeting the practitioner's needs, for their Atlas provides him (and the student) with a very good substitute for a dermatological clinic. The arrangement of the diseases in alphabetical order makes for easy reference and for easy identification of a particular eruptive process in an emergency, while the book has sufficient general interest to be read in moments of leisure. Each of the 103 coloured plates is accompanied by a short but adequate description, to the compilation of which Dr. Semon has clearly given much thought and care. The essentials of diagnosis and treatment, thus presented, are exactly what they should be, precise and sufficient, and they are amplified by the frequent reference in the text to features represented in the plates. In describing their book as an Atlas the authors direct the attention to the illustrations as an outstanding feature. Those who have endeavoured to photograph eruptions by the ordinary process know how difficult it is to obtain a faithful reproduction of the minute structure of disease; when a colour-process is employed all the difficulties are enormously increased. Dr. Moritz's achievement, using the Finlay colour-process, in overcoming technical difficulties is remarkable; the colour-reproductions exactly represent the appearances seen on the actual patient.

Science and Practice of Surgery

Fifth edition. By W. H. C. ROMANIS, M.A., M.B., M.Ch. Cantab., F.R.C.S. Eng., F.R.S. Edin., Surgeon and Lecturer on Surgery, St. Thomas's Hospital; and PHILIP H. MITCHINER, M.D., M.S. Lond., F.R.C.S. Eng., Hon. Surgeon to H.M. the King, Surgeon and Teacher of Operative Surgery, St. Thomas's Hospital. In 2 vols. Pp. 1751. London; J. and A. Churchill Ltd. 1934. 14s. each vol.

WHEN a student's text-book of surgery becomes and remains popular, editions appearing in quick succession, it is clear that the subject has been treated comprehensively, lucidly, and attractively. The authors of this book have shown great judgment in the presentation of the facts of surgery and in their selection of those essential to the equipment of the undergraduate up for his finals. Moreover, he will need no supplementary surgical volumes, for all the special branches of surgery are adequately dealt with. Much of the sections on diseases of the eye and on the nose and throat have been rewritten, and a rather satisfactory plan of printing all descriptions of operations in a different type has been adopted. Though a great deal of revision has been carried out and new matter added in the fifth edition, the book as a whole has actually been reduced in size.

Romanis and Mitchiner's surgery is a treatise with an established place which can be confidently recommended as one of the best text-books in the English language.

Definite Diagnosis in General Practice

By W. L. KITCHENS, M.D. London and Philadelphia: W. B. Saunders Co., Ltd. 1934. Pp. 958. 45s.

IN this book Dr. W. L. Kitchens has collected and tabulated 506 symptoms "of definite diagnostic significance" and 407 "disease entities." By an ingenious system of cross-references the reader is supposed rapidly to discover in which of these diseases any given symptom may arise and, conversely, what are the significant symptoms of any given disease. (It should be explained that the term "symptom," as used by Dr. Kitchens, includes physical signs.) Thus, to the possessor of this book, diagnosis becomes merely a rule-of-thumb or, rather, a penny-in-the-slot affair without the penny—apart from the initial purchase price.

It is conceivable that there are doctors who will be glad of a diagnosis-machine of this kind though it is probable that, like lonely people who keep a frog, they are extremely rare. The book is admittedly incomplete—Dr. Kitchens in fact invites the reader to fill in the gaps and even leaves ample spaces for this to be done; it is also unscientific and inaccurate. For example, trypanosomiasis and epidemic encephalitis lethargica are apparently lumped together as one disease entity under the heading of "sleeping sickness." It is easy to avoid the grosser diagnostic errors without the aid of books like this, and one might reasonably conclude that the only thing definite about a diagnosis of sleeping sickness made on the lines here suggested is that it would be definitely wrong.

Human Sterility

By SAMUEL RAYNOR MEAKER, M.D. London: Baillière, Tindall and Cox. 1934. Pp. 276. 18s.

NO one has given more time and attention to the study of the problems of human sterility than Dr. S. R. Meaker and this able work will be read with great interest. The fact that he has been responsible for the establishment in America of special clinics at which both the male and the female sides of the problem of sterility are fully investigated has given him exceptional opportunities of assessing the factors that contribute to childless marriage. At these clinics the husband and wife who have failed to produce a family undergo an examination lasting a week. This includes not only a complete clinical overhaul, but also various metabolism tests carried out in order to bring to light any endocrine insufficiency. That this is an important part of the routine investigation is shown by the fact that pituitary dysfunction is discovered to be present in over 30 per cent. of cases, and thyroid failure in 20 per cent. of cases of impaired

fertility in the male. Usually a full diagnostic study of a sterile couple reveals the fact that more than one condition depressing the conceptive mechanism is present. Treatment must therefore be directed to the amelioration of all the factors hostile to conception. This multiplicity of factors also explains the riddle of selective fertility and does away with the necessity of presupposing such subtleties as physical or psychic incompatibility. Selective fertility is due merely to the result of the sum total of depressing factors contributed by a given man and a given woman when united together in an effort to produce a family.

This is the record of a vast amount of painstaking work. Nobody but an enthusiast could have carried through the scheme of research that Dr. Meaker evolved in the establishment of his clinics, and nobody who is interested in the same problem can fail to be stimulated by his book.

Practical X-Ray Therapy

By HUGH DAVIES, M.A. Oxon., M.R.C.S. Eng., D.M.R.E. Camb., Officer-in-Charge of X Ray Therapy, King's College Hospital; Hon. Assistant Radiologist, National Hospital, Queen-square. London: J. and A. Churchill Ltd. 1934. Pp. 134. 8s. 6d.

THIS little book is intended for the student rather than the expert. On the whole the facts are presented clearly and without any attempt to crowd in technical details not required for a general outline. A chapter on biology explains concisely the changes produced in the cell by irradiation, and the section devoted to the apparatus required for deep X ray therapy is designed to give the reader an idea of the mechanism whereby penetrating X rays are produced. The measurement of dosage and the factors which affect it are next discussed, and also the importance of the unit skin dose, and of the percentage depth dose. The time factor is mentioned, but in view of the present interest in fractional dosage and intensity, more space might have been devoted to the relations to the treatment of malignant disease. The section on treatment is divided according to the region to be treated, and the directions given follow, for the most part, the accepted lines, although the author hardly gives the impression that he himself is satisfied that all the conditions mentioned are really suitable for X ray therapy. He tells us that the suggested doses are based on the fractional method. Any attempt to treat patients from the descriptions given without further instruction would be unsafe; there is no indication that the author expects this attempt to be made, but this is pre-eminently a field where a little knowledge is dangerous, and we trust that readers will realise this. A short bibliography is provided at the end of each chapter.

Knights of St. John in the British Empire

By Colonel E. J. KING, C.M.G., F.S.A. St. John Ambulance Association, St. John's Gate, London, E.C. 1934. Pp. 268. 7s. 6d.

Colonel King, who has written much on the British Order of the Hospital of St. John of Jerusalem, gives us the official history of the Order brought up to date. An earlier edition, published some ten years ago, had for its purpose a description of the part played by Englishmen since the revival of the Order, but the activities of the Grand Priory during the interval afford much fresh material. In particular the work of the Order for humanity, as exemplified by the St. John Ambulance Association and Brigade both at home and overseas, has been notable.

The history of the Order is set out here in full detail and many of the episodes are truly dramatic. The Order was founded when the first Crusaders under Godfrey de Bouillon captured Jerusalem and discovered there an ancient hospital for Christian pilgrims. This Duke Godfrey endowed, and the Order of the Hospitallers of St. John took shape with the double object of fighting for the Cross against the pagan and of providing medical aid for Christian travellers to the Holy City. The Knights Hospitallers were soon to be associated in their work for Christianity with the Knights Templars, a purely military order, also making itself responsible for the safety of Christian pilgrims, and the two Orders became a prominent part of the fighting force of the little Latin kingdom of Jerusalem, and for some 200 years battled to save that kingdom from its inevitable doom. Through the vicissitudes of the Order under many great Masters we see its tenacity in the face of adversity, and when the Latin kingdom of Jerusalem, betrayed by western supporters and surrounded by increasing Moslem power, came to a virtual end, the Knights of St. John kept for many years some hold on strategic points along their old coast line, looking for the day of recovery. That, however, never came, and in 1310 the Knights took possession of Rhodes, becoming a Sovereign Order, while their wealth was increased by the transfer to them of the revenues, it is true much diminished, of the suppressed Order of Templars. Rhodes was held by the Knights for over 200 years and was the scene of two famous sieges, of which the latter one resulted in the loss of the island in 1520. The Order, quite undefeated, now established itself in Malta and for some 300 years was a notable landmark of chivalry, but the Reformation brought with it fundamental troubles to all old Christian foundations. The original object of the Hospitallers being the establishment and maintenance of the catholic faith in the face of Moslem aggression, the natural patron of the Order was the Pope. The papal responsibilities, however, seem to have been capriciously discharged, and when England and the Pope were at issue the Order suffered. Oppressed under Henry VIII. fairer prospects seemed to open up under Mary to die down again under Elizabeth, and practically the activities of the Order became centred in Malta, to come to a temporary end when Malta was seized by Napoleon at the close of the eighteenth century.

The history of the Knights Hospitallers on the continent was so eventful as to overshadow their work at home in the minds of most of us, but Colonel King does justice to the splendour of the "English Tongue" of the Order in their famous establishment at Clerkenwell and their other commanderies in Great Britain and Ireland. He thus supplies the reason for the restoration of the Grand Priory in the British Empire, and the story of expansion which follows is unbroken. It is made historically dramatic by the fact that the work now done at the hospital of the Order in Jerusalem, and by the St. John Ambulance Association and Brigade in peace and war, wherever and whenever the call may come, is a logical development of the duties of the Knights Hospitallers as enjoined upon them by vows taken over 800 years ago. Colonel King does justice to his big theme in a record which is of historic interest from both ancient and modern aspects, and the format and illustrations are excellent.

THE LANCET

LONDON: SATURDAY, DECEMBER 29, 1934

A VISION OF HEALTH

"WHERE there is no vision the people perish," but there is hope when our young men see visions and our old men dream dreams. Both Dr. VEITCH CLARK, in his recent presidential address [1] to the Society of Medical Officers of Health, and Dr. F. R. SEYMOUR, in a Chadwick lecture entitled "Men and Masses" delivered on Dec. 10th, contrasted the public health conditions of past ages with those of to-day and showed us something of their vision of the future. Dr. CLARK, indulging in "a little unfettered mental browsing," reminded us that it is not many years since those who advocated much of what is now routine were looked on as visionaries with freakish ideas. But it was in the practical imagination of these pioneers that the foundations of life-saving in aggregated modern communities were laid. He contrasted the ravages of infectious disease in the past with the solid ground we tread to-day in the daily practice of preventive medicine. Dr. SEYMOUR deprecated undue optimism in attributing all the credit for the reductions that have taken place in various diseases to our established methods of sanitation. Diseases have a periodicity of their own and their incidence rises and falls independently of our efforts to diminish them. Yet even this is no ground for pessimism or for relaxation of effort. Since infectivity and virulence are independent, waves of increased infectivity may be postponed until a time when virulence is in the trough.

In regard to the future, both addresses opened up a field of philosophic speculation. Dr. CLARK remarked that, useful as it may be to lower the death-rate, preventive medicine is concerned not with the dead but with the living. In his view the great mass of human minor ailments, which makes for so much of life's discomforts and restraints, is the result in succeeding generations of damage done to parents or grandparents by the presence of one or more of the great disabling diseases—syphilis, tuberculosis, and rheumatism; in the generations begotten by those who have suffered from them, disabilities are directly caused by the transmission of an injured germ-plasm. We are refreshed, as by a clear wind from the hills, if we can conceive of our preventive work against systemic diseases as laying a foundation on which, in the generations to come, will be built the work of abolishing those chronic indispositions the sum of which so dims and blots the brightness of the joy of living. Dr. SEYMOUR speculated on possible future lines of advance in preventive medicine in terms of the law of cause and effect. The chain may be long, but wise men have here and there succeeded in picking up the successive links; only the foolish deny a possible causal relation between two events, even though it appears at first sight improbable and far-fetched, until every known means of proof and disproof has been exhausted. The more widespread the operation of a cause, the less likely are its results to be recognised as such. Among primitive races the birth of a child was not known to be causally related to the procreative act; the wearing of corsets was once so prevalent that the physiology books of the early nineteenth century described a male abdominal type of respiration and a female upper thoracic type, little wotting that the cause was whalebone; night air was regarded as dangerous until someone opened the windows and demonstrated that the only thing wrong about night air was that it was never admitted into our houses.

Of micro-organisms, for a time the *ultima thule* of inquiry into infectious disease, some, said Dr. SEYMOUR, have been shown to be in themselves completely non-virulent.

> "In disease due to organisms of several, perhaps of very many kinds, the disease begins only if special circumstances are present, in which some change in the body, due to some other factor than the infecting parasite itself, has been brought about; the defence or immunity of the host is complete as against the parasite so long as that is acting alone." [2]

It may therefore be admitted that in the coccus, bacillus, spirochæte, or ultra-filtrable virus, we have not reached Spinoza's *transeunt cause* of infective disease, the cause that is essentially distinct from and not included in the effect, the thing that is sufficient to produce another different thing. In support of such a view Dr. SEYMOUR adduced the fact that what is now regarded as evidence of disease used, at an earlier period, to be regarded as evidence of a predisposition to disease. Writers of the Chadwick epoch regarded contaminated water as a predisposing cause of cholera, and conversely the Tibetan looks on tea as a prophylactic against typhoid fever. So too the little extra exertion that leads to an attack of apoplexy is no more than a detonant that fires a train already long laid. It may be that in many diseases, including some that are not regarded as infectious (for there is no necessary association between "infectious" and "preventable"), what we now consider to be predisposing causes may turn out to be in fact early stages of actual disease. Expressed diagrammatically, as Dr. SEYMOUR put it, our health line is doubtless far below the level that it should, and may in the future, attain; but each of us has what we regard as our normal level of health, subject to little ups and downs according to season, temperament, transient illness, accidents, and other factors. On being attacked by a definite disease the health line will show a dip, to an extent depending on the severity of the illness, and if the disease be a progressive one, the line will get continually lower until it reaches zero. But the student of preventive medicine centres his interest on the point at which the health

[1] Public Health, November, 1934.

[2] Med. Research Counc., Annual Report, 1924–25.

line *begins* to leave the horizontal. Clearly, the greater the drop, the greater the difficulty in returning to normal. The diagnostic faculties and facilities of 200 years ago were not fine enough to enable the existence of "consumption" to be established until it was fairly far advanced, for the writers of that period clearly describe as "threatened with consumption" what we now know are early cases of definitely established disease. Earlier diagnosis greatly increases the prospect of restoring the individual to normal health, because there is less leeway to make up, the fall below normal at the earlier stage being much less than at the later. Our art has therefore for one of its aims the pushing back of the point of time at which diagnosis is made until it gets closer and approximates to the point marking the onset of morbific effects. When we shall have done that there is a further field—namely, the pushing back of the moment of diagnosis until it predates the onset of manifest illness, there being always a time lag between that and the earliest beginnings of disease.

An aim, according to the late Lord BALFOUR, to be worthy of pursuit, must not only exhaust our energies but also transcend our aspirations. The search for the *transeunt cause* of disease is then a worthy aim. It will tax our energies for countless generations and for countless generations it may elude us. But advance we have made and much more advance we shall make. Both Dr. SEYMOUR and Dr. VEITCH CLARK urge us to go back and back and still further back in the life-history of our patient and of our race in our search for the true origins and real causes of the ills from which the human body suffers. Who shall say that in this they are misdirecting us?

EPSOM COLLEGE

THERE will be found this week in our advertisement columns a detailed statement from Major W. L. GIFFARD, the secretary, concerning Epsom College as a public school of general scope, connected with a medical foundation. The statement is excellently clear in bringing out the two sides of the College, and we refer our readers to it (vide THE LANCET General Advertiser, p. 29). Certain difficulties arising out of the double organisation were alluded to in a pointed manner at the last annual meeting of the Old Epsomian Club. At this meeting Mr. R. M. HANDFIELD-JONES, himself an Old Epsomian, speaking from the chair at the annual dinner, said that the benevolent side of the foundation must be divorced from the school.

In many matrimonial affairs, to which the word divorce inevitably directs attention, difficulties are often adjusted with success before drastic procedure is found advisable, and while Mr. HANDFIELD-JONES'S pronouncement met with useful support, those who know the circumstances of the foundation, and those who digest the significance of Major GIFFARD'S statement in the advertisement section of this paper, will see that, while adjustment may be called for, anything in the nature of divorce will require justification before practical steps can be taken, and these will need much thinking about. Is the status of the school prejudiced in the public mind by an impression that, because of the original foundation, all the boys at Epsom are beneficiaries under some charitable scheme? This is a view that cannot be widely held, and is quite mistaken. Epsom College ranks as one of the public schools of the kingdom, the concession to the medical profession being that there is, apart from the scholars, a small reduction in favour of the sons of doctors from the annual fees, made upon the same principle as that upon which at other schools reductions are made for the sons of the clergy or of officers in the army. The original foundation of Epsom had for its object, first, the provision of pensions for aged, disabled, or impoverished men or their widows; and, secondly, the grant of scholarships to the sons of deceased medical men who were unable during their lives to accumulate money for the education of their children, or who are to-day in reduced circumstances. To maintain the benefits of this foundation there is an urgent need of funds. There are now at Epsom 56 scholars who are boarded, clothed, and maintained at the expense of the foundation. They are elected from among the sons of necessitous or deceased medical men or women, and the claims to the benefit are rigorously scrutinised by the council of the College, a governing body of a very representative character. A sum of over £10,000 is required annually to meet the cost of the foundation scholars and the pensions, while there is ample evidence that much more money is required so that the work should be extended.

The original founders of the College, while having the charitable side of the institution always prominent in their minds, desired that the education given to the beneficiaries should be that which boys receive at first-class schools, and owing to the sagacious and devoted manner in which the educational curriculum has been supervised over a long period of years the training at the College has been in all directions comparable with that given at similar institutions. Boys are prepared for the services, civil and militant, for the universities, and for professional or mercantile careers. Provision has been made for all the amenities of a big public school and leaving scholarships have been founded. But funds are urgently needed that this steady rate of progress should be maintained, and we commend the foundation of Epsom to the attention of our readers. We have done so before on many previous occasions, and acknowledge with gratitude the large response that has followed from a profession which is not composed of many wealthy men. The finest form of assistance which those in our profession who have can give to those of their colleagues who have not, is the provision that the children of the latter shall have the opportunities for making good, which their parents have been unable to assure to them. We speak for a cause which justifies itself not only on its merits

but by the excellent use which has been made, and is being made, of all subscriptions, gifts, and bequests to the College. The story of Epsom is one of progress, while the indications for lines of advance are such that they must call for substantial support in money.

STAPHYLOCOCCUS FOOD POISONING

THAT certain staphylococci can produce food poisoning has been established not only by monkey tests with sterile filtrates but by a large number of experiments with human volunteers.[1] Moreover, several outbreaks have now been recorded where the staphylococcus has been definitely incriminated. The isolated strains differ widely both in cultural and in agglutinative characters. Some are hæmolytic, some are not, some are of *albus*, some of *aureus* type. Prof. E. O. JORDAN of Chicago has shown also that the strains producing toxic filtrates are not restricted to those isolated from implicated foods but may be derived from many sources, including normal and diseased human throats.

The vehicle in which the organism is conveyed is mostly "cream cakes," filled with custard rather than pure cream, although in the first recorded outbreak (M. A. BARBER, 1914) the agent was milk. Cream-filled pastries often contain a few staphylococci, but the sound articles do not appear to contain organisms in numbers comparable to those found in the implicated foods. With W. BURROWS, JORDAN has recently described[2] five characteristic outbreaks which occurred in America in 1932 and 1933. The first of these, in Milwaukee in March, 1932, involved 54 persons, all of whom had eaten custard-filled pastries; from an uncut cream-filled cake of the same batch numerous staphylococci were isolated. From one strain a toxic filtrate was obtained, and 20 c.cm. of this filtrate given by mouth to a rhesus monkey caused violent vomiting 4½ hours later. All the victims were violently ill after an incubation period of about three to four hours; none died. The second outbreak was in Chicago in April, 1932; 31 persons were affected, the vehicle being again cream-filled cakes. The incubation period was similar, and again nausea and vomiting were the most characteristic symptoms. Staphylococci were isolated and sterile filtrates caused violent vomiting in several rhesus monkeys. The third outbreak occurred in Milwaukee in May, 1932, and involved seven children, all of whom had eaten custard-filled coffee cake. The staphylococci isolated produced a filtrate toxic to a monkey, and the same applies to that obtained from dough-nuts filled with custard associated with the illness of two persons in Chicago in the same month. The outbreak in Winona in May, 1933, involved several cases, the vehicle being chocolate eclairs, and from these also a staphylococcus was isolated yielding a filtrate toxic to monkeys.

Several features associated with staphylococcal food poisoning still remain obscure. Although the number of recorded outbreaks amount to a dozen or more, they are rare indeed when we consider the probable frequency of infection of foodstuffs with the organism. Toxin-producing staphylococci are not uncommon, and there must be some unknown factors which cause them to produce enterotoxic substances in certain cases. In the laboratory various methods may have to be tried before toxic filtrates are obtained; in these recorded outbreaks the best results were procured when the culture was incubated in an atmosphere of 20 per cent. CO_2. A suitable medium is essential, and it is noteworthy that custard-filling standing at room temperature is likely to be an excellent culture medium. Another curious feature is the geographical limitations of the proved cases. Almost all have occurred in America, and although since the establishment of staphylococci as a source of food poisoning English bacteriologists have been on the look-out for them, no outbreaks have been recorded in this country, though staphylococci are as common here as in America, and cream-filled cakes are much consumed. The conditions favourable to the production of toxin from the organism appear to be even less prevalent here than in America. This circumstance has led some workers to doubt the incidence of food poisoning due to these organisms, but the evidence supplied has convinced most toxicologists and the facts now seem to be well established.

[1] See THE LANCET, 1930, i., 1354; 1932, i., 33; 1933, ii., 197.
[2] Amer. Jour. of Hyg., November, 1934, p. 604.

VESTIGIAL SURVIVALS IN THE POOR-LAW

FROM time to time, in our public health and other rate-aided services, there are signs of a too rigid regard for local boundaries. Summoned to the scene of a traffic accident, an ambulance stops shorts and goes home because the victim is lying a few yards beyond some invisible line of demarcation. A patient is refused admission at a council's hospital because he is only a temporary visitor to that council's area. Mutual arrangements can be made between local authorities, but a certain spirit of non-coöperative parochialism still survives in public assistance as a relic of the curious law of settlement and removal which various representative committees of the London County Council recommend should now be repealed. If an excursion into ancient history be permissible in the holiday season, the problem must be viewed against its mediæval background.

From time immemorial everyone in England has legally belonged to some particular parish—the parish of his "settlement." Thus from the beginning it arose that the local inhabitant who had to contribute to the relief of his indigent fellow-parishioners was naturally anxious to limit his liabilities. For this and other reasons it befell that the poor were penned within their own parishes. If the labourer was found outside, he and his family were liable to be removed in custody to what was believed to be their proper parish where possibly their "settlement" would be still further disputed on arrival. Under statutes of Edward VI. (partly aimed at the wandering monks dislodged from the suppressed monasteries) all aged, impotent, and lame persons who were

beggars could be removed from any parish where they had not acquired a domicile by birth or three years' residence. An Elizabethan amendment enabled them to be hunted home even if they did not beg. In 1662 a further widening was enacted. Henceforth, for a century and more, any stranger who entered a parish to take up work or for any other laudable purpose might be removed in custody with his wife and family in circumstances of severe hardship, however good his character. If he could give security that he would never become chargeable to his adopted parish, or if he rented property of a certain value, he was safe; otherwise he lived under threat of exile. ADAM SMITH went so far as to say that almost every poor man of 40 would at some time have suffered from this ill-considered law of settlement. This was an exaggeration, but there was at any rate incessant inter-parochial litigation and enterprising workmen could not move freely to get work. The statute of 1662 was not mitigated till 1795 when Parliament decided that, except for the rogue and vagabond and the unmarried mother, nobody should in future be removed unless he or she actually became chargeable to the poor rate and was not too sick or infirm to travel. Other ameliorations were slowly added but even now the old law of settlement and removal is not yet dead. To-day a person acquires a settlement by birth, apprenticeship, ownership of property, payment of rates or three years' residence, or by derivation from husband or parent; he can become "irremovable" by one year's residence. But, if he is removable, and if he receives assistance outside his place of settlement, the cost can be thrown on the local authority of his place of settlement and to that place he can be removed on an order of the justices. The substitution of the county and the county borough for the parish (as the poor-law area and the place of settlement) has diminished minor local complications; on the other hand, individuals and families now travel about more freely than they did.

All this is not a mere matter of ancient history. Lately the London County Council sought to prove that a woman patient in one of its mental hospitals was in fact "settled" in a county borough in South Wales which ought to pay for her future maintenance. An order was obtained against the Welsh authority, but a hitch occurred because doubts about the continuity of her residence in that borough between 1891 and 1925 made it possible that her real settlement was in a Welsh county. An order was obtained against the county, but further inquiry showed that her settlement was in the county borough after all. The county borough appealed to the London sessions whither 20 witnesses were brought from Wales by one side or the other. In the end the appellant authority was adjudged chargeable after substantial costs had been incurred. Is it surprising that local authorities should consider that this antiquated law of settlement and removal, which has no application outside poor relief, is ripe for repeal? Actual residence at the moment when the need arises is the criterion for the purposes of the Mental Deficiency Acts, public health hospital service, tuberculosis treatment, education and unemployment insurance transitional payments. Might not the same test apply to poor relief? It is nowadays the sick, aged, and infirm who are "removed" under the law; they have often little connexion with their original "place of settlement," and for old people it is no small hardship to be ordered away from their surroundings and possibly separated thereby from their friends and their relations. The recent report of the L.C.C. committees refers to two other matters incidental to the proposed repeal of the ancient law. Section 80 of the Poor Law Act of 1930 deals with the recovery of the cost of relief by reason of accident or illness in the case of a person who has a fixed abode in a county or county borough but who happens to be temporarily in some other county or county borough which is not his place of settlement. Here there is no enforced removal and not much risk of litigation. The object of the section is financial, but its operation involves administrative expense and complicated book-keeping. The report recommends that Section 80 should also be repealed. Secondly there is a question (arising out of Section 5 of the Local Government Act of 1929) of the "settlement" of patients treated in appropriated hospitals. In London it is the practice that inhabitants of the county who do not appear to be "removable" are treated on admission as "municipal patients"; their assistance is not afforded under the poor-law. But on admission of a non-inhabitant, or of an inhabitant who appears to be "removable," arrangements are made to classify him as a poor-law patient with a view to inquiry as to his place of settlement and the possible recovery of the cost of his maintenance from the appropriate local authority. Here, therefore, and also in the mental hospitals service, there are consequential difficulties requiring adjustment if the old principle of settlement and removal is abolished. The advocates of such abolition are not unaware that there is material for argument on the other side. They can truly say, however, that this is no time for preserving restrictions upon the movement of able-bodied unemployed, and that the cumbrous enactments of settlement and removal, with their history of compulsion and hardship, ought to have no place in an amended poor-law.

ON another page will be found a report of the discussion in both Houses of Parliament on the new scales of relief proposed by the Unemployment Assistance Board which are to come into force on March 1st, 1935. As Sir Francis Fremantle points out, the analysis of the various items in the poor family's budget which underlies the grading of the scales is a method acceptable in itself and capable of great development in the future. Whatever the adequacy of the proposed scales—and there was sharp divergence of opinion on the point—the attempt to base them on scientific inquiry opens a new chapter of social legislation in this country.

ANNOTATIONS

DRUGS AND THE EPILEPTIC SUBJECT

THE part played by sedative drugs in the production of mental deterioration or mental abnormality in epileptics is difficult to assess, although this is a matter of practical importance to all practitioners of medicine. It is known that luminal in moderate doses occasionally produces irritability, which may, though rarely, amount to something approaching mania; more often, and in larger doses, the drug may cause sleepiness and a slowing down of the mental functions. If luminal or bromide is given over long periods does it, as many of the public appear to believe, inflict permanent mental injury on the patients? Dr. J. Fetterman and Miss Margaret Barnes,[1] of Cleveland, have made some serial studies of the intelligence of epileptic patients, and though their contribution, as a whole, is not very convincing on the question of sedative drugs they are interesting. They claim to show that there is no fall at all, or only a negligible fall, in the intelligence quotients of patients over a period of many years during which they have been taking sedatives regularly. The position with regard to bromide has been dealt with rather fully in two recent papers. Dr. J. C. Sharpe,[2] of Baltimore, gives an alarming picture of acute bromide intoxication in five men and five women. The common symptoms appear to be difficulty in speech and swallowing, a coated tongue, coarse tremors, and difficulty in walking, but the neurological signs are very varied and the mental condition may be that of almost any psychosis. Diagnosis can only be made by urine and blood examination, but treatment, by stopping the drug and administering chlorides, is always efficacious and cure is rapid. One of the patients is said to have taken 180 g. of bromide a day for three weeks, and another about 450 g. a day for six weeks; unfortunately we are given no idea of the quantities taken in the other eight cases, but presumably they were quite outside the ordinary therapeutic zone. None of Dr. Sharpe's patients was epileptic, but there is a good deal of evidence that some of them were mentally abnormal before they started taking bromides. The practitioner may be reassured by a very interesting paper by Dr. Paskind, of Chicago,[3] who has studied 54 cases of epilepsy, seen in private practice, who have been taking bromide steadily for periods of from 1 to 17 years. The usual daily dose was 60 g., in only two cases was it less than 45, and in five it was as high as 90. In three cases only was any mental deterioration noticed. All the other patients were able to retain their employment during the long period of observation, many of them being professional men and women. The percentage of deterioration, Dr. Paskind believes, is no greater than that which would have occurred without any medication. Without fear of doing the epileptic patient any mental harm, therefore, he may receive 60 g. of bromide a day, a dose which in England would be regarded nowadays as large. But if this is correct some explanation must be found of the grave and frequent warnings given by high medical authorities concerning the serious effects of bromide on the patient's mind. Dr. Paskind explains them by the failure to adjust the dosage to the patient's tolerance. Dosage in excess of the tolerance will produce intoxication with its typical mental and physical picture—remove the bromide, he says, and the signs of intoxication will disappear. This intoxication differs from deterioration, which is chronic and ineradicable. Moreover, Dr. Paskind holds that the whole bromide question has been obscured by reports on epileptic patients in institutions, most of whom were destined to deteriorate in any case, and in whom periodic behaviour disturbances were often quite erroneously attributed to the drug. It is certainly wise to be cautious in crediting epileptics generally with psychological deviations from the normal that have been observed only in institutional patients.

[1] Archives of Neurology and Psychiatry, Oct., 1934, p. 797.
[2] J.A.M.A., May 5th, 1934, p. 1462.
[3] Ibid., July 14th, 1934, p. 100.

MALNUTRITION IN VIENNA

ACTING on the report of the Conference held in Berlin in December, 1932,[1] an investigation of the effects of the economic depression on the population of Vienna has been made by A. Götzl, W. Kornfeld, and E. Nobel.[2] Their main inquiry was directed to the circumstances and physical condition of 558 families of the unemployed and 152 families in which the head of the family was in work. These two groups did not differ appreciably in their housing or in such factors as household cleanliness, but the income of those at work was some two and a half times that in the possession of the out-of-work (including public and private assistance) and the heaviest charge on the budget of the latter was the debts they had acquired. When information on these social particulars had been obtained the members of the families submitted themselves to medical examination, and a detailed comparison is made of their physical status. In both height and weight the males in the unemployed group are found to be uniformly below the level of the employed; with the females, however, no significant difference is apparent before age 20 is reached when the adults in the unemployed group are inferior to those in the employed group. It seems difficult to attribute differences in height of adults to the consequences of unemployment, and the authors recognise that some form of unpremeditated selection might be responsible—e.g., there might be a greater frequency of unemployment in families that are already "psychophysically impaired." They, however, think it probable that at least part of the difference must be regarded as a result of unemployment, that "bad living conditions and also an unfavourable mental condition have contributed to the development of a stoop." If this belief be accepted the differences in weight may likewise be accepted as evidence of malnutrition; but if the diminished height is merely the result of an undetermined selective force, then weight (in view of the high correlation between the two measurements) must be similarly affected. It may be noted that the present series of figures in comparison with those collected in Vienna in 1920 and 1923 by Nobel and Pirquet[3] show both for males and females from age 6 to age 20 a uniform superiority both in height and weight. There is, therefore, *if* the samples of the population are really equivalent, evidence of improvement between these dates.

The authors also compare their employed and unemployed groups by means of Pirquet's Pelidisi index, but no significant differences between them are thus made apparent. On the other hand, a second investigation of children and adolescents, in one

[1] League of Nations, Quart. Bull. Health Organisation, 1933, ii., 1.
[2] Ibid., 1934, iii., 3.
[3] Zeits. f. Kinderheilk., 1923, xxxvi.

group of which the father or other breadwinner was unemployed and the other employed, showed a larger proportion of children with a high index in the employed group while more children in this group had a height and weight above the measurements taken as normal. In this comparison the children of the unemployed show to distinct disadvantage. Differences to the disadvantage of the families of unemployed persons were also noted in the blood-content of the skin and visible mucous membranes. Generally, therefore, the authors conclude that a defective physical development of unemployed persons' children is demonstrated. Their paper does not make easy reading but at least the 21 tables of figures must be very carefully considered by those interested to satisfy themselves upon this interpretation.

OXYGEN CONSUMPTION AND NITROGEN METABOLISM

WE are familiar with the fact that protein food, in virtue of its "specific dynamic action," increases the general metabolic rate, and we regard this effect as almost inevitable. No matter how urgent the requirements of the tissues are for nitrogen, the amino-acids must run the gauntlet of the portal circulation immediately they are absorbed, and in the process many of them are de-aminised and their nitrogen is lost as urea. It is true that the remainder of the molecule may be converted into carbohydrate and stored, but for some reason the chemical changes brought about by the liver are accompanied by a general increase in the oxygen consumption of the body, and the dissipation of energy as heat. We do not often think of the amino-acids produced by the wear and tear of our own tissues as exerting a specific action on the metabolism, but they do so, and the fact is rendered significant by the observations of Dr. C. W. Baldridge and his associates,[1] of Iowa City, on blood destruction and regeneration. They find that in the treatment of pernicious anæmia there is storage of nitrogen during erythropoiesis; that is, less nitrogen is excreted in the urine and fæces than taken in by the mouth. This storage is accompanied by a definite fall in the basal metabolic rate of the patients—the reverse aspect of specific dynamic action. Moreover, in cases of leukæmia under X ray treatment, and of polycythæmia vera during phenylhydrazine administration, there is great destruction of blood-cells, and the amount of nitrogen lost in the excreta exceeds that ingested in the food. Here there is an increase in the basal metabolic rate of the patients. Blood destruction and regeneration experimentally produced in dogs appear to have the same effects on gaseous metabolism as in man. An experiment performed with phlorhizin is interesting. This substance, administered to dogs, lowers the renal threshold to glucose which is therefore turned out in the urine; the blood-sugar level becoming in consequence reduced, the carbohydrate stores are drawn upon and finally exhausted. The animal is reduced to producing carbohydrate from the protein of his food or tissues, and naturally the endogenous katabolism of protein is much increased. Baldridge has followed the recovery from phlorhizin diabetes, presumably accompanied by restoration of tissue, and finds nitrogen storage with lowered metabolism, as in human patients during blood regeneration. In general all his results fit in with the statement that oxygen consumption varies with the endogenous protein metabolism. This raises many interesting physiological issues, among which is that of temperature regulation. We may regard heat production as determined in the main by a general level of metabolism in the tissues, probably controlled by autonomic and endocrine influences, and as adjusted to the needs of the moment by variations in the state of contraction of the muscles. Into this scheme we may have to introduce another factor in the shape of the specific dynamic action of the waste tissue protein, or its opposite if tissue is being regenerated.

[1] Arch. Internal Med., October, 1934, p. 517.

NATIONAL BIRTH CONTROL ASSOCIATION

THIS association, with which the Birth Control Investigation Committee is incorporated, has published its annual report this month, and is able to show evidence of activity and progress. The issue by the Ministry of Health in May of Circular 1408 has given an impetus and direction to the work of the association. Under this circular it is now possible for local authorities to advise at their clinics every woman for whom pregnancy is medically detrimental, including cases of grave malnutrition as well as of specific disease. What is or is not medically detrimental will be decided by the doctor in charge of the clinic, and this is a distinct advance. The branches of the association now number 19 and it is desired to appoint new organisers to attack new areas and form new branches. The work of the Birth Control Investigation Committee has proceeded satisfactorily during the year and grants have been received by it from the Medical Research Council and from the Eugenics Society which have been a great encouragement.

HEALTH AND FUTURE OF THE NORWEGIAN GIPSY

A RECENT study by Dr. E. Gisholt[1] suggests that modern conditions of life, in Norway at any rate, may be exerting such a profound influence on the gipsy that his future as such, distinct from the rest of the community in which he lives, seem problematical. From far back in European history the gipsies are referred to as a trouble to the authorities in Norway, and their handling has not been simplified by the later infusion of more foreign elements, such as an invasion by gipsies from India and other sources such as occurred after the 30-year war. The Norwegian gipsies of to-day are composed of different elements, with an aristocracy—of a kind. The policy of the authorities in the past towards this vagrant population may be described as intermittently punitive, defensive rather than paternal. But in 1897 a more constructive and humane attitude found expression in the creation of the Gipsy Mission which has since sought a solution of the problem by tackling it in infancy, without wasting its energies on the adult. The Mission has organised homes to which gipsy children over the age of 4 years are not, as a rule, admitted, the extreme age-limit being 6 years. The children, accordingly, start a new life before they have acquired an incurable taste for the vagrant life of their parents. Living in these homes till they are 11 or 12 years old, the children enjoy the benefits of a religious education and physically and psychically healthy surroundings. Experience has shown that about 75 per cent. become self-supporting without adopting a vagrant life. As medical officer to one of these homes, Dr. Gisholt has made a special study of the bodily and mental health of its inmates. It might have been supposed that a gipsy's life is so airy that rickets would be rare, but a third of the children examined showed signs of this disease—the result, no doubt, of the

[1] Tidsskrift for Den Norske Lægeforening. Oct. 1st, 1934, p. 961.

defective artificial feeding to which they have been subjected, and of a sunless and airless sojourn in the cabins of gipsy boats. Enuresis was also common, a sign of a neuropathic or psychopathic degeneration. Intelligence tests disproved the common belief that gipsies are exceptionally gifted mentally; a certain low-grade nimbleness of wit is all that they could be credited with as a class. In the nineties of last century it is stated that there were some 4000 gipsies in Norway. By 1927 this figure had been halved, and at the present time there are only some 1800 gipsies living as such. It would, therefore, seem that the day is not far distant when the rest of the gipsy fraternity will have been absorbed by the general population of the country.

VERTEBRAL ANGIOMATA

As a subject of pathological interest angioma of the spinal column seems to have been recognised by Virchow, but the clinical recognition and description of these tumours dates only from 1926. In a general review of their characteristics J. A. Lièvre [1] states that the early symptoms can usually be traced back to adolescence or to early adult life; but the disease progresses so slowly that it may take 20 or 30 years to cause death. The symptoms are almost entirely nervous, and are due to backward growth of the tumour pressing on the spinal cord or on the spinal roots. Even in the early stages these symptoms may be definite enough to allow of their reference to a vertebral cause; but the diagnosis of angioma can be made only by radiological examination. The X ray picture is quite characteristic. It shows the disease, as a rule, confined to one vertebral body; occasionally vertebræ at a distance from one another may be affected, but this is rare. The intervertebral spaces show no encroachment, and the discs are normal. The affected vertebra varies in shape; its height is neither increased nor decreased, and the upper and lower limits are definite. There is no collapse such as is seen in secondary deposits of carcinoma. Little increase in breadth may be noted, but more typically the vertebral body is considerably swollen laterally, giving an ovoid outline in the antero-posterior radiogram. The texture of the bone is finely porous, showing an irregular network of clear spaces and darker trabeculæ. The pedicles, laminæ, and spine appear normal.

There seem to be two main clinical types of the disease. In the first, or paralytic type, the patient suffers from a steadily progressive paraplegia, with all the usual complications, which eventually prove fatal. There is no pain, and therefore (one must suppose) no pressure on the dorsal roots; this absence of pain is, of course, in conspicuous contrast to the paraplegia of secondary carcinomatous deposits in the spine. The case described by Dr. Mary Lacey and Dr. Seymour Smith in our issue of Nov. 24th was an example of vertebral angioma of this type with a history of 26 years' complete paraplegia. The case now described by Lièvre under his care is an example of the other clinical type, characterised by severe pain radiating along the distribution of the dorsal roots. The pain started at the age of seven and was sciatic in distribution. It was temporarily relieved by immobilising the spine in a celluloid jacket and by keeping the patient lying down, but after 23 months it increased until the slightest movement provoked extreme pain. The first lumbar vertebra was affected, and percussion of this vertebra also produced the pain. Records of other cases mentioned by Lièvre show that the pain is sometimes referred directly to the diseased vertebra and in others radiates. The clinical type is determined, at least in part, by the anatomical form of the tumour. Where it grows backwards so as to reduce the lumen of the vertebral canal, pressure paraplegia results. In other cases it irritates the nerve-roots and causes pain. The differential diagnosis from other vertebral lesions causing paralytic or pressure symptoms depends almost wholly on the radiogram. No other disease gives quite the "porous vertebra" picture, syphilis providing the nearest approach to it.

Vertebral angioma is a very slowly progressive disease. Treatment resolves itself into deciding whether, at the particular stage when it is recognised, any interference is justified or necessary. Surgical removal, although it has been attempted, seems to be altogether too formidable a procedure; hæmorrhage is the main danger. Relief of pain is the chief indication for treatment, and here radiotherapy seems to be remarkably successful, although it has no effect on paraplegia—or indeed upon the radiographic appearances, which often show no correspondence with the symptoms.

[1] Presse méd., 1934, xlii., 1571.

SAVING THE PEDESTRIAN

In an address to the British Science Guild on Dec. 19th Mr. Mervyn O'Gorman pleaded for a new science. It is to collect and interpret the data of road problems, to measure traffic flow, and somehow to diminish the ratio of fatalities to running miles. The Royal Society would be invited to nominate as members of a research committee (paid by Government and reporting directly to the First Lord of the Treasury uncontrolled by the Ministry of Transport) experts in physics, mechanics, mathematics, chemistry, geology, metallurgy, statistics, physiology and psychology. Upon this new science no name has yet been conferred. May we suggest the title of pedestriantics? It is clear that Mr. O'Gorman's best hopes are centred on the psychologist's analysis of the motives and reactions of foot-passengers. No one, he says, has any legal right to use the highway except for the single purpose of innocuous passage. Yet here are these wayward creatures insisting upon shop-gazing, chattering to their friends, admiring and photographing the street architecture, singing and preaching, standing in queues, begging, airing dogs and children, playing ball games or taking betting slips. Seen from above, by the archangel peeping over his cloud, or the traffic director looking down from his autogiro, pedestrians are the most numerous and fragile of traffic units—up-ended sticks whose vertical bodies give no index of their intended direction unless perchance they are pushing a perambulator. In default of a law to compel them to move in one direction on one side of the carriage way, wheeled traffic has to force them to decide their line of motion in a manner which in the past has created not a little ill-feeling. The psychologists will have to take into account a certain John-Bull refusal to be shepherded. Just as the bicyclists object to wear white tails like rabbits even to save their lives at night, so the pedestrian will resent a decree to keep to the left. He will keep to the right where he can face his dangers. Statistics of traffic flow and running miles mean little to him. However lavishly the country may be afforested with orange groves, he will not abandon his independence merely to give fast-moving vehicles a longer ribbon of road surface. When Parliament permitted the Road Traffic Act to produce a subsidiary Highway Code, it was careful to let the latter remain hortative rather than mandatory. If Parlia-

ment now felt strong enough to order the pedestrian to keep to the left, magistrates might still deal very leniently with a breach of the law. But by all means let us have the proposed inquiry in addition to the investigations already conducted by the Ministry of Transport. When psychologists have thoroughly examined the pedestrian in their test-tubes, it may be possible to save him in spite of himself.

HEALTH OF THE ROYAL AIR FORCE FOR 1933[1]

LAST year there were 30,868 men in the Royal Air Force, a decrease of about 1000. Sickness amounted to 53 per 1000 of strength, counting only admissions to hospital and sick quarters, or 76 per 1000 including all absences from duty. Disease was responsible for 82 per cent. of the total sickness, injuries for only the remaining 18 per cent.; the fairly constant relation between disease and injury noticed in previous years is thus maintained. Deaths in the R.A.F. numbered 3·7 per 1000 of strength against 3·6 in the previous year and 4·4 in the five-year average. Of the deaths from disease 5 were due to pneumonia, 4 to syncope, 3 to tuberculosis, and 1 to each of 20 other specified causes. Of the 51 deaths from injury 16 occurred as a result of motor accidents when off duty. Cases of injury or illness are greatly more frequent among the younger men, especially at home; influenza particularly attacked those almost boys. It has now been decided to Schick and Dick test all new entrants and protectively to inoculate all non-immunes. This was begun in September, 1933, and so far no case of scarlet fever or diphtheria has appeared among that entry. Much attention has been given to the need for and the use of oxygen in high flying and parachuting, as well as to the methods for warning a pilot when he needs oxygen. A new study of the effort syndrome has led to the recording in all cases of the rate standing for "the first five-seconds period," which is now regarded as a more reliable guide than "the lowest steady rate" of former years. The diet of apprentices is being studied with a view to improvement. Catering in general must have been done with great care as the only outbreak of food poisoning mentioned in the report is one of six slight cases in Iraq. Aeroplanes have increasingly been used for transport of the sick; in the Persian Gulf naval sick have been thus brought to hospital at Basra. We note that the R.A.F. gave medical attention to Assyrian refugees in concentration camps.

PAROXYSMAL HYPERTENSION

A RECENT issue of a Paris journal[2] is devoted almost exclusively to paroxysmal hypertension. According to Donzelot, the condition may be divided into three groups: (1) hypertensive paroxysms superimposed upon a permanent hypertension; (2) hypertensive paroxysms associated with certain diseases (e.g., lead poisoning, eclampsia); and (3) paroxysmal hypertension due to a chromaffin tumour. Of the last-named, a number of cases have received notice in these columns during the past year,[3] and a very good account of the clinical features was given by Prof. de Wesselow in his second Croonian lecture.[4] It seems likely that in this type of case hypersecretion of adrenaline is the exciting cause of the paroxysms, but in the other two groups the cause is more obscure. Several factors, humoral and nervous, come into question, and it is hard to assess the relative importance of each. In this publication a useful summary of the different theories will be found, with descriptions of several illustrative cases and a number of references.

THE CASKET LETTERS[1]

WE reviewed Sir George Turner's defence of Mary Queen of Scots in THE LANCET some 18 months ago; the second edition appears this week, and in it there is much new matter. The Casket Letters are now given in full in the different languages side by side, while the analysis and criticisms of eighteenth century authors have been enlarged and added to. Undoubtedly, as Sir George suggests in his preface, many historical facts in a lurid and complicated story have come down unquestioned, to be detected later as not facts at all, while the literature dealing with Mary Queen of Scots has always been influenced by religious or political bias, or by both. Sir George has made an elaborate inquiry into Mary Stuart's innocence or guilt. He started his investigations with an open mind and has come round to the firm belief in Mary's innocence, and the evidence on which this belief is founded he gives with great completeness. The story is a terrible and fascinating one, and its medical implications are frequent. The physical and mental make-up of the various characters in the drama undoubtedly influenced the course of political events as well as the actual episodes; once again we see what light pathology may shed upon history.

INTERNATIONAL UNION FOR COMBATING CANCER

THIS Union is taking practical shape. Founded last March in Paris its main objects are to form a link between organisations concerned in the study of cancer, to combat charlatanism, and to propose criteria for a uniform system of international records. To attain these things it is proposed to organise international congresses and to issue occasional bulletins. No less than 32 countries were represented at this preparatory conference, when it was decided to ask each country to nominate two delegates to meet annually as the governing body of the Union. A meeting for the purpose of electing these two national delegates was held in London on Dec. 13th and was attended by representatives of all the organisations proposing to join the International Union, together with the original British delegates to the preparatory conference—viz., Lieut.-Colonel A. B. Smallman (Ministry of Health), Mr. Richard Davis (British Empire Cancer Campaign), Dr. W. Cramer (Imperial Cancer Research Fund), Mr. Sampson Handley (Middlesex Hospital), and Mr. Cecil Rowntree (Cancer Hospital). At this meeting Mr. Rowntree and Dr. Cramer were elected to represent Great Britain.

A LONG INNINGS

A LETTER, not exactly intended for publication, reaches us from Mr. Percival Turner; the gist of it will appeal to many of our readers who may have availed themselves of his services as a medical agent. Mr. Turner attains his sixtieth year of business activity at the close of 1934, and in his letter he desires to express gratitude to the medical profession for their support during this long period, a sentiment which is quite naturally associated with the business statement that the Agency is being carried on, suitably manned, for the continuation of the work.

[1] Report on the Health of the Royal Air Force for the year 1933. H.M. Stationery Office. 1s. 6d.
[2] Bull. et Mém. Soc. méd. hôp. de Paris, 1934, No. 31.
[3] THE LANCET, 1933, ii., 1382; 1934, i., 665; 1934, ii., 630, 714, 1130.
[4] Ibid., 1934, ii., 636.

[1] Mary Stuart: Forgotten Forgeries. Revised edition by Sir George Turner, K.B.E., C.B., F.R.C.S. Eng. London: Rick and Cowan Ltd. 1934. Pp. 456. 6s.

PROGNOSIS

A Series of Signed Articles contributed by invitation

XXXIII.—PROGNOSIS IN PUERPERAL SEPSIS

WHEN a rise in the temperature occurs in a woman in the puerperium some form of infection is rightly suspected. The anxiety then is centred on what form the infection is going to take.

Acute endometritis, or local uterine sepsis, and septicæmia are the two types of infection that are most often seen. That the prognosis is extremely good in the former and equally bad in the latter is so well known as to require no emphasis. Therefore the problem that presents itself is an early and accurate diagnosis.

LOCAL UTERINE SEPSIS

The majority of cases of acute puerperal endometritis possess a clinical picture that is constant, and no doubt exists as to the diagnosis. The patient is well in herself, she sleeps and eats well and makes no complaint unless it is of slight discomfort in the lower abdomen. The temperature is raised to 99° and 101° F. and the pulse-rate is rarely above 100 at any time in the day. The tongue is moist. The lochia are offensive and the uterus involutes slowly and is tender on palpation. When this state of affairs exists it is safe to prognose a rapid recovery to health, without a long illness, though in a number of these patients the condition of chronic endometritis will supervene. Chronic endometritis may be expected especially in those patients in whom the original acute infection is known to be due to the retention of membrane or of a small portion of placenta.

However, in a not inconsiderable minority of patients who suffer from acute puerperal endometritis the degree of infection and the accompanying clinical picture is much more severe than the typical text-book description that has been outlined above. Thus the condition may become evident on the first or second day of the puerperium and the rise in the temperature may be so severe as to be accompanied by a rigor. The pulse-rate, too, may reach 120 or more per minute and remain at about that level throughout the 24 hours. Inability to sleep, a dry tongue, and loss of appetite may be present. These symptoms most certainly give rise to great anxiety. But if in addition there is present a bulky, tender, subinvoluted uterus and a profuse offensive lochia, the infection is localised and the prognosis correspondingly good. A lengthy illness and prolonged period of convalescence need not be expected, and in the absence of additional symptoms a rapid return to normal is usual. Such cases are not cases of undiagnosed septicæmia. The blood culture is persistently negative and recovery as a rule is rapid.

Nevertheless, the persistence of even a slight degree of pyrexia and of a pulse-rate that continues in the region of 96 to 108, whether it follows the mildest or most acute attack of puerperal endometritis, must postpone a really optimistic outlook. This failure completely to settle probably signifies a condition of thrombo-phlebitis in the large venous sinuses in the uterus, and, in the presence of undoubted tenderness in the lateral vaginal fornices, of extension of the inflammation to the pelvic veins. Femoral thrombosis may ensue. Sometimes the infection spreads along, and persists in, the Fallopian tubes, giving rise to pelvic peritonitis or salpingitis. This condition will result in a long period of convalescence, complicated perhaps by laparotomy.

SEPTICÆMIA

A positive blood culture signifies a blood-stream infection; on the other hand, a single negative result is of little value. The mortality-rate from puerperal septicæmia has been variously estimated to be from 4 per cent. to 80 per cent. Allowing for a number of undiagnosed cases the mortality-rate can probably be taken as one in two. It is usually stated that the height of the temperature is of less importance than a pulse-rate that is persistently rapid. But a pulse-rate of 120 or more is to be expected in septicæmia. Likewise the patient is as a rule sleepless. Repeated and severe rigors are unusual and are of grave significance. In the condition of septicæmia the infection may become apparent in various parts of the body. Thus at the onset of pulmonary complications the gravest prognosis should be given. In a few cases peritonitis may develop. If vomiting, diarrhœa, and abdominal distension, without much abdominal pain at first, are noticed a fatal result may be expected.

The symptoms of vomiting, diarrhœa, abdominal distension, together with evidence of free fluid in the peritoneal cavity, suggest, as has been mentioned above, the diagnosis of streptococcal general peritonitis. Uncomplicated by septicæmia the prognosis is by no means fatal and probably recovery takes place in about half the cases. The treatment of this condition is to make a midline subumbilical incision and to drain the pouch of Douglas and both renal pouches by means of long pliable glove-rubber and gauze-wick drains. The patient must be disturbed as little as possible. Nitrous oxide and oxygen is the anæsthetic of choice and the small operation, which takes only a few minutes to perform, is best done without moving the patient from her bed. The early diagnosis and treatment of this condition greatly improve the prognosis. Early drainage appears to lessen the severity of the paralytic ileus and the consequent exhausting pain experienced by the patient.

Should jaundice develop the end will be rapid. On the other hand, should the infection become localised in joints or bones, although a lengthy illness is certain, a more favourable outlook exists as regards the life of the patient. A moderate degree of leucocytosis should be regarded as favourable, but is seldom seen in cases of septicæmia.

A less favourable prognosis should always be made when the infection has followed any operative procedure. Such an event will almost inevitably have caused damage to the maternal tissues with a lowering of the local resistance. Cæsarean section is interesting in this respect. It is of importance to note that should an infection occur after this operation the prognosis is bad. In other words, a mild and relatively harmless localised infection is far less likely to be anticipated after a Cæsarean section. The appearance of the signs and symptoms of sepsis at such a time usually herald the onset of such conditions as septicæmia or general peritonitis.

OTHER FACTORS

Other factors which might be expected to influence the prognosis of puerperal sepsis are the condition of the patient at the end of labour, the bacteriological findings, and the time at which treatment is started. A worse prognosis is to be expected in a woman who is weakened by loss of blood, a severe toxæmia of pregnancy, or some intercurrent disease.

The bacteriological examination of the lochia must be made from the contents of the uterus and not from those of the vagina, and from whatever source the material is obtained, anaerobic as well as aerobic cultures must be made. Should the organisms in the lochia be *B. coli*,

staphylococci, enterococci, or diphtheroids in pure or mixed culture it is probable that the body will localise the infection and the prognosis as a result will be good. On the other hand a pure growth of hæmolytic streptococci from the lochia is of serious import irrespective of the findings of an examination of the blood. Localisation in the uterus of an infection by this organism is unlikely and the prognosis will vary with the extent and direction of the spread. Likewise the finding of a hæmolytic streptococcus in the blood stream in a case of puerperal sepsis is of grave significance. It seems that a less gloomy prognosis can be offered if the organism is found only on anaerobic culture.

EFFECT OF TREATMENT

The treatment of localised uterine sepsis usually amounts to no more than rest in bed, as the vast majority of cases recover quickly. In the severe types of acute endometritis the prognosis is improved, not only by a quicker recovery but also as regards the lessened risk of complications, by the early use of intra-uterine glycerin. The specific treatment of streptococcal septicæmia covers a large field. Many methods have been suggested in the past few years. In every instance the recorded success of any one method has failed to stand the test of time and to uphold its value. Occasionally the use of anti-scarlatinal serum in large doses seems to have been of value. With this possible exception there is no one specific remedy that appears to alter the prognosis however early it is employed.

THE CHANCES OF A SUBSEQUENT PREGNANCY

Acute local infection of the uterus does not seem to influence the fertility of the woman. This of course is not so when the infection involves the Fallopian tubes or spreads to the peritoneum. Should salpingitis or peritonitis be present sterility will probably result. Chronic endometritis, uncomplicated by chronic salpingitis, on the other hand, does not appear to be nearly so potent a cause of sterility as might be expected. The fact that pregnancy has followed the thorough curettage of an unhealthy endometrium does suggest that occasionally endometritis does cause sterility. A recurrence of sepsis in any succeeding pregnancy need not be feared. Following an infection in the puerperium, no matter how severe, such recurrence is unlikely, except after: (1) an infective thrombo-phlebitis which is likely to recur in a subsequent puerperium and should be carefully watched for; (2) a *B. coli* infection of the urinary tract (Dugald Baird). *B. coli* infection is, however, generally a cause of puerperal pyrexia rather than of puerperal sepsis. The streptococcus, if it does remain dormant in the tissues, awaiting the stimulus of another pregnancy to awaken it to further activity, appears to do so only in the event of salpingitis or peritonitis, and as has already been said, these conditions usually result in sterility. A streptococcal infection of the endometrium seldom persists as such; the infection soon becomes mixed and the streptococcus disappears. Even if it persists puerperal sepsis need not occur for it will probably not be pathogenic to the woman.

In conclusion, an accurate prognosis can seldom be made during the first three or four days of the pyrexia period. A case whose clinical features lead to an almost certain diagnosis of streptococcal septicæmia with a grave outlook has frequently turned out to be a severe *B. coli* infection of the urinary tract and placental site, a condition the outlook of which is relatively excellent.

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PANEL AND CONTRACT PRACTICE

AN ASPECT OF "HOSPITAL ABUSE"

IT is often stated that panel doctors send their serious cases to hospitals, with the implication that they are shifting responsibility from a service which is paid for doing this work to hospitals which are not paid for doing it. That is an easy accusation to make—in some areas there may be reasonable foundation in fact—but the truth about the whole position is not easy to arrive at. An analysis of the situation viewed from the standpoints of the insured person; his employer; the insurance practitioner; the panel and insurance committee; and the hospital and its staff reveals that many different and some difficult questions are involved.

The insured person goes in sickness to the insurance doctor of his choice; he is easy of access, his hours of attendance are known. This patient may not have the slightest idea what is the cause of his trouble; if he thinks he has a lump somewhere which ought not to be there he will not be surprised if the doctor tells him he needs an operation. In a locality where access to hospital is easy, he will expect to be sent there for the operation and may be surprised if his doctor suggests doing it himself in the consulting-room or at home. But rural practitioners undertake more operative work than urban ones and their patients expect it. Probably most insured persons would prefer their own doctor to operate if they knew that he laid himself out to do that sort of work. If, however, his own doctor tells him, after adequate examination, that the trouble is such that he would like a hospital opinion about it, or that it is something for which treatment at home is not possible, or that it needs further investigation to determine its nature by methods which can only be employed in hospital, the insured person recognises that his doctor is taking trouble about him, is acting in his interests, and readily consents to take a letter to hospital about his case. In the first instance patients often dread being sent to hospital knowing they may have long to wait before seeing a member of the visiting staff. They are grateful for any little kindness shown them by nurses, students, or by the consultant himself when they see him, and after the ordeal they are glad to be sent back to their own doctor. If for some reason they have to return to hospital for treatment which cannot be obtained at home they soon begin to find their way about—how to arrive late without losing turn, how to slip in at side entrances—and become reconciled to hospital attendance unless it costs them too much, for they will have to pay for medicines or dressings, for X ray examination, quite apart from the cost of obtaining food whilst away from home. They may complain about the cost to the insurance committee; but such complaints are not common, because the patient realises he has been sent to hospital for his own benefit, while the hospital is not making anything out of him. And patients who thus become well versed in hospital methods will go direct to hospital with some subsequent illness, hoping to see old friends, without consulting their insurance doctor at all.

The employer comes into the picture both as the man who is paying half the cost of medical benefit and possibly as a subscriber to the hospital. If he

is the sort that looks after his workpeople he will find out why his employee is away and who is looking after him. If he is told that the insurance practitioner's attendance is unsatisfactory he may bring pressure to get the case into the hospital to which he (or his firm) subscribes. It is not uncommon for an employer to initiate a complaint to the insurance committee about an insurance doctor's treatment or to allege negligence in the attendance of an employee. Employers have an inconvenient habit, based on kindness, of calling in their own medical attendant to attend a servant or employee. The inconvenience is that this doctor may, without consulting the insurance doctor, send the case to hospital simply because the employer wants him to go there.

The insurance practitioner should use the hospital as he would use a consultant for a private patient, not forgetting that there is a consulting service for better-class insured persons with reduced fees, which avoids the fatigue and waiting of the out-patient department. Either method requires a letter telling the history of the case and treatment so far given, asking for an opinion, and requesting that the case may be sent back with diagnosis and suggestions for further treatment, unless for any reason the patient must be retained in hospital. Simply to give the patient a visiting card is hardly courteous to the consultant, and a standard hospital letter is obtainable for the purpose. Then the insurance practitioner may use the hospital as a place to send patients requiring such treatment or investigation as cannot be carried out in the surgery or at home, e.g., urgent conditions like obstruction, or chronic conditions like duodenal ulcer. But the insurance practitioner is expected to perform all the duties which come within his terms of service. Whitlows are frequently sent to hospital; it is so easy to tell a patient that the hospital has more conveniences for doing these things—better nursing, better surroundings—and to give the impression that the patient's welfare is the sole consideration, when the practitioner may only be yielding to the temptation to place trouble on the broad impersonal back of the hospital. He may be able to justify a statement that it would require 24 hours to get the assistance of another doctor to give an anæsthetic if required, and the plea will be accepted, but it is in fact wrong to send small cases to hospital. It should not be forgotten that insurance prescriptions cannot be given for dressings or medicines in cases attending hospital; it has been ruled that the doctor can only supply them for patients on his own list whom he is himself attending.

The panel committee comes into the picture only to disabuse the public of the notion that insured persons are foisted on the hospital on every possible occasion. It holds no brief for the doctor who acts in this way, and most committees would be prepared to take disciplinary action if it could be proved that such delegation of duty and responsibility was a regular practice. The insurance committee on the other hand is much concerned, as it frequently receives complaints from insured persons as a result of something discovered in hospital or of some criticism of the treatment outside, no worse perhaps than the innocent remark "It is a pity this case did not come in sooner." Rarely this committee may have a complaint about the cost of dressings and drugs incurred through attending hospital. In the main the abuse of hospitals by insured persons does not often come officially before it.

To the hospital another side of the picture is presented, and it is as a rule the house surgeon or house physician who first sees the insured person who comes for treatment. This officer should know, if anyone does, whether many small cases are sent by doctors with letters when the doctors might themselves have given the attention, or whether such cases come to the hospital mostly on their own initiative. But the house officer must usually lack experience in health insurance matters. His duty scarcely goes beyond making certain that patients, whoever they are, see the appropriate member of the honorary staff. The hospital consultant is in the best position to deal with hospital abuse if it exists. While the casualty case is likely to escape him unless some complication occurs, he does see all the new out-patients with letters from doctors. But his course is not easy when the hospital secretary publishes in the annual report the out-patient total as evidence of the good work of the year. Again the member of the staff may know that the particular practitioner who sent the case up to him would prefer to have it looked after in hospital, and why should he risk offending him? The patient may indicate his wish to try hospital treatment as he was not improving at his own doctor's hands, and why should the member of the staff offend the patient, possibly sent by an important subscriber? And last but not least, the consultant's out-patient department is the only place where he can follow the results of treatment for any length of time. His private cases for the most part he sees only once; he may never know whether he has done them any good or not. In the out-patient department the difficulty of finance is eliminated and the doctor can study the results of this or that treatment week after week, even year after year.

The attitude of the hospital authority is largely a matter of finance. Insured persons are entitled to certain benefits from their approved societies; many of them are members of the Hospital Saving Association, and this source of remuneration is put against their cost as in-patients. Only the simplest form of certificate is required—that X. Y. was admitted (or discharged) on such and such a date—and this can be given by any hospital officer; it does not need a doctor's signature. The hospital authority has tried by various means to get from insurance money the amount expended on drugs and appliances for insured persons. One hospital endeavoured to put its dispensary department under contract with the insurance committee for the supply of drugs to insured persons but this was disallowed as the insurance chemist can only charge to the drug fund prescriptions signed by the insurance doctor himself. But although financially the insured person may be something of a burden to the hospitals there is no movement on their part for his exclusion.

THE LATE DR. CHARLES DUNDEE.—Dr. Charles Dundee, of Ballycarry, a well-known medical practitioner in Co. Antrim, died on Dec. 13th as a result of an accident. He was driving himself, and when leaving the Ballycarry dispensary he found his car difficult to start. He pushed it a certain distance downhill, endeavoured to board it while it was running, but slipped and was pinned to the ground by the car, receiving fatal injuries. Dr. Dundee leaves two sons, members of the medical profession, one practising in Ballycarry and the other in Whitehead. He himself held the position of dispensary medical officer at Ballycarry for no less than 52 years, and was a justice of the peace for the district.

SPECIAL ARTICLES

DIETETIC DEFICIENCIES AND SUSCEPTIBILITY TO INFECTION

WITH SPECIAL REFERENCE TO CHILDREN *

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FAMINE and pestilence: by long and ancient usage these two words are linked together, and bring to mind the toll taken by microbial diseases when a people is subjected to severe dietetic deprivation. Famine, it is true, brings in its train many other ordeals as well as lack of food: the manifold trials associated with long treks by great bodies of people, the breakdown of sanitary arrangements, the hardships of excessive heat or cold, all these are familiar to us in the accounts of famine conditions. Yet I venture to suggest that pre-eminent among them as a cause of the pestilence is the dietetic factor itself, and that a diet quantitatively or qualitatively inadequate greatly increases susceptibility to infection.

Consider the Russian famine after the late war. Naturally in times of scarcity the food deficiency is not quantitative only; those who cannot get enough to satisfy their hunger eat what they can get, and in different persons and at different times different defects predominate. Here are some observations made by a one-time Royal Free Hospital house surgeon [1] working with a relief unit in the Volga region after the war. He states that at one period, presumably in the Volga region, one-third of the population was suffering from typhus. In addition, relapsing fever and typhoid were epidemic, and later in 1922 and 1923 there was a pandemic of malignant subtertian malaria with a very large mortality. He gives some figures (taken from official sources) for children who were transported in Red Cross trains from famine areas to Moscow. These, he says, were picked individuals, chosen as being those most likely to survive. Of 24,000 children arriving in Moscow, about 6000, or 25 per cent., were "hospital cases"; of these 6000 children 40 per cent. were suffering from skin diseases, 10 per cent. from typhus or typhoid, and 5 per cent. from trachoma. Among about 1300 children sent to Leningrad there was a similar incidence of disease. Measles broke out among them, and the mortality of those who developed it was 60 to 80 per cent. Such figures are eloquent both of the increased susceptibility to disease and of its severity among these children. In the winters following the famine scurvy was very widespread, and among children with scurvy there were many cases of cancrum oris. During another period bilateral gangrene of the feet and hands (presumably ergotism), together with extensive ulceration of the skin, was common in the children's hospitals.

PRISON DIETS AND DISEASE

So much for the increased incidence and severity of infections in time of famine. A somewhat grim commentary on the effects of an inadequate diet may also be obtained from certain prison statistics. Dr. J. P. Mitchell,[2] of Uganda, describes the appalling conditions which may occur in prisons, and mentions a certain gaol in which the death-rate rose from 40 per 1000 (or 1 in 25) in 1926, to 280 per 1000 in the first six months of 1928—a seven-fold increase. So that in the latter year for every fourth man a sentence of one year's imprisonment was equivalent to a sentence of death. Apparently, though overcrowding and other factors were also at fault, Dr. Mitchell attributes this death-rate primarily to dietetic deficiencies and consequent infections. He compares it with the death-rate in English prisons which is considered excessive if it rises above 10 per 1000. In another prison where dysentery was prevalent, the rate was reduced from 86 per 1000 in 1928 to 34 in 1930, and Dr. Mitchell says that "there was no doubt that diet was in the main the principal factor" in this improvement.

DEFICIENCIES IN BRITISH DIETS

Fortunately among our own British population none of us are acquainted with famine conditions; but on the other hand an inadequate diet is, week in week out, the daily lot of very many of our people. For those who want proof of this there is the very valuable piece of work carried out in Aberdeen and Peterhead,[3] which shows that in those towns the diet of working-class families is, according to the standards usually accepted, frequently below the minimum needs for health in calories, protein, calcium, phosphorus, and iron—not to mention various vitamins. What is true of these areas is presumably also true of many other cities in the United Kingdom.

Again, consider Corry Mann's [4] observations on schoolboys, aged from 6 to 11, living in a large institution near London. He showed, as you will remember, that an addition to their diet of a daily ration of one pint of milk produced a marked improvement not only in general health and energy, but also in the rate of growth, both as regards weight and height. The texture of the skin was improved and the incidence of chilblains and pot-belly lessened, while the freedom from infection in this group was striking when compared with the controls. Other food supplements were given to groups of boys with the object of testing the effect of increasing individual factors in the diet. The supplements tried were: sugar, margarine, butter, casein, and watercress. None of these produced as good a result as the milk supplement, though with several there was definite improvement in growth and health. Somewhat similar observations with similar results [5 6] have been carried out on school-children living in their own homes in Glasgow, Aberdeen, Paisley, Dundee, Edinburgh, Peterhead, Belfast, and other districts.

Such findings prove that large numbers of school-children are suffering from unsatisfied dietetic needs, and also, as one would expect on clinical grounds, that the deficiencies are multiple. Corry Mann's schoolboys, for example, showed much improvement when their supply of calories, fat, and fat-soluble vitamins was increased by giving a ration of butter, and improvement also followed upon a daily supplement of watercress; but in neither case was the increase in weight and height as great as that obtained by the blunderbuss addition of milk, which contains most of the constituents of a complete diet.

So much for school-children. Spence in Newcastle has recently investigated the health of groups of children aged 1 to 5. He compared the physical condition and incidence of disease in 124 children of professional families and 125 children from very poor areas in the city. Putting it in round figures his records show that pneumonia, chronic or recurrent bronchitis, and measles were over eight times more

* An address to the London Association of the Medical Women's Federation on Nov. 27th.

common among the "city" children than among the "professional class" children. No doubt housing conditions and other factors play their part, but can any doubt the important rôle played by diet? 80 per cent. of the "city" children had hæmoglobin levels falling between 75 per cent. and 50 per cent.—i.e., four out of five were definitely anæmic—and this factor alone, as I hope to show, would greatly increase the susceptibility to infection.

I propose now to consider some of the information we have as to the part played by individual dietetic deficiencies in relation to susceptibility to infection. It is, however, very difficult to assess the ill-effects of any *one* deficiency, because in human diets deficiencies, when they occur, are usually multiple. Before I begin on this subject, may I emphasise a point which, though frequently forgotten, will I think be accepted by everyone as reasonable—namely, that enough is as good as a feast. If the diet contains enough of any dietetic constituent, no improvement in health is to be expected from giving more. For this reason I propose to say little about the various experimental studies concerned with adding vitamins to diets which were apparently already adequate in that respect.

Let us start by considering two deficiencies that produce well-recognised changes in the body, and whose effects must be taken into account by every clinician in this country—that is rickets and anæmia due to iron deficiency.

VITAMIN-D DEFICIENCY

Rickets often develops in babies and young children in this country wherever special precautions are not taken to prevent it. In descriptions of the disease by clinicians, reference is made again and again to the association of respiratory infections with rickets, yet it is not easy to prove that the association is one of cause and effect, though I personally am convinced that it is so. For nearly two years shortly after the war I was working in Vienna as a member of a unit sent out to investigate the problem of rickets. A prophylactic observation was carried out on two groups of babies living under similar hygienic conditions, side by side in the same wards.[7] As events subsequently showed, one of these groups was unprotected from rickets, and these children suffered from a much higher incidence of respiratory infection than the protected group. It is well known that otitis media is often associated with respiratory infection, and among the rachitic children the high incidence of chronic or recurrent attacks of otorrhœa was striking. On the other hand, the incidence of gastro-intestinal infections in the two groups was roughly the same. Unfortunately the diets differed in many respects. The protected group received more milk, less carbohydrate, and had in addition a daily ration of cod-liver oil, so that it is not possible to claim that the increased incidence of respiratory infections was the result of vitamin-D deficiency and of nothing else. The impossibility of clearly relating cause and effect owing to the complexity of most diets is a constantly recurring difficulty in such investigations. Hence some clinicians remain unconvinced. Prof. S. Clausen,[8] for example, in a study of respiratory infections in infancy, reached the conclusion that rickets when considered alone probably does not influence infection, but he does not give any details. Barenberg, Greene, and Abramson,[9] co-workers with the late Prof. Alfred Hess at the Home for Hebrew Infants in New York, where many very valuable dietetic studies have been carried out, compared the incidence of pneumonia among rachitic and non-rachitic children in that institution. They actually found that cases of pneumonia were about four times as numerous in the non-rachitic group. Their cases of rickets were all slight, but even so such a surprising result can, I think, be explained only on the supposition that the non-rachitic children did not provide a suitable control group—and that there was some other big difference of which we are unaware between the conditions of controls and rachitic cases.

So far I have asked you to consider the resistance in rickets to bacterial invasion. The mechanical factor—namely, the soft chest wall and the thoracic deformity of rickets—must also be taken into account. There can be no question that when the chest wall loses its rigidity and gives at every inspiration, prognosis in acute chest infections must be made worse. When, in addition, the intrathoracic capacity is markedly reduced by deformity of the wall, partial collapse of the lung is an additional handicap. Anyone who has watched rachitic infants, say of 5 or 6 months, suffering from pneumonia will have noticed how very rapidly deformity of the chest often develops. Such cases make one realise that even early rickets may severely hamper the young infant in its struggle with a respiratory disease.

Animal experiments to some extent supply the lack of clinical data, for we have records of at least two spontaneous epidemics among rachitic and non-rachitic rats, where apparently the only significant difference in the diet or environment of the two groups was in the vitamin-D intake. P. György[10] and his associates record an outbreak of catarrhal infections (Erkältungsepidemie) among rats. Of 41 rachitic rats 39 per cent. died, whereas of the 13 control rats, in spite of their ill-fated number, not one died. An account of a laboratory epidemic of paratyphoid among rachitic rats has been published by Eicholz and Kreitmair.[11] Out of 24 rachitic rats 20 died, whereas out of 24 non-rachitic rats only 2 died, and the only difference in the diet was that the non-rachitic rats received irradiated ergosterol daily. Such positive evidence is striking and difficult to refute, and many other laboratory workers have also reached the conclusion from their own observations that vitamin-D deficiency lowers resistance. Here again, however, opinion is not unanimous: Mellanby,[12] for example, quotes his work on dogs who developed severe rickets. He concludes that dogs suffering from rickets are not especially susceptible to pneumonia, though they do suffer from areas of pulmonary collapse, whereas dogs suffering from both vitamin-A deficiency and vitamin-D deficiency show a very high incidence of pneumonia. He lays stress on the rôle of vitamin-A deficiency in this result; but whatever the separate part played by each vitamin it is certain that the double deficiency enormously increased the mortality from pneumonia.

To sum up my own conclusions as regards vitamin-D deficiency and infections, I should say that, in spite of the negative findings of some workers, there is sufficient evidence, both from clinical and from laboratory work, to make us pretty certain that a deficiency of vitamin D decreases resistance, and to suggest that in the human young the susceptibility is especially to respiratory infections. A chest wall softened and deformed by rickets certainly renders the prognosis in pneumonia or acute bronchitis much worse.

IRON DEFICIENCY

Among the dietetic deficiencies common in this country, iron deficiency and its associated anæmia

must take a prominent place. Iron deficiency is extremely common in infants and young children, though often only slight in degree, and in a series of babies under my observation those which were slightly anæmic from lack of iron showed an increased susceptibility to *all* the common types of infection.[13]

There is much evidence that this type of anæmia is widespread, and is not limited to any one type of diet or to any one part of this country. Hence I think it is safe to claim that by the administration of iron as a routine measure at all welfare centres a very large reduction in infant morbidity could be effected. Those of us who have had the responsibility for the treatment of severely anæmic babies are left with the impression that they go down with every infection which they can manage to catch, and often in severe form. Moreover, a vicious circle may be set up; while the infection is active the anæmia responds but poorly to treatment, and while the anæmia persists the patients' resistance to infection is low. Often these babies suffer from persistent otorrhœa, repeated attacks of bronchitis, nasal discharge, or cervical adenitis, and time and again when the anæmia is finally cured a long-standing infection will entirely disappear. Incidentally this increased susceptibility to infections is accompanied by a diminished rate of gain in weight.

As regards adults, Davidson and his co-workers in Aberdeen find that nearly half the working-class mothers whom they examined were suffering from a nutritional anæmia due primarily to inadequate iron in the diet. Reckoned on the same basis it appears that about one-third of the women bringing up their children to the Queen's Hospital for Children in London are anæmic. Like others who have watched anæmic patients under treatment, the Aberdeen workers comment on the remarkable increase in energy and vigour produced by a rising hæmoglobin level in mothers who had forgotten what health is. Think what this must mean to the welfare of a whole working-class family. If in babies susceptibility to infection and iron deficiency are closely correlated, is it not probable that this also holds true of their mothers, and that iron therapy offers a valuable weapon in the fight against maternal morbidity and mortality?

VITAMIN-C DEFICIENCY

Scurvy in children in London to-day can fairly be called a rare disease, hence vitamin-C deficiency, unlike vitamin-D or iron deficiency, is presumably a comparatively rare factor in lowering resistance to disease among London children. This is undoubtedly largely due to the popular knowledge among mothers of the need of giving fruit and fruit juice. When vitamin-C deficiency *does* occur there is no doubt that resistance to infection is lowered. Since this vitamin is fairly easily destroyed by pasteurisation of milk or by processes used in the preparation of babies' feeds, it happens that when fruit juice is not given to babies vitamin C may be the only deficiency in an otherwise adequate diet. For this reason it is easier to study the syndrome of vitamin-C deficiency, and its relation to infection, than that of most of the other vitamin deficiencies. In reports from abroad concerning large groups of scorbutic infants and young children infections are mentioned as very common. For instance, Bloch[14] in Denmark reports that among 32 children suffering from scurvy there were 30 per cent. with severe infections. Hess,[15] from his extensive observations on cases of scurvy in babies, commented on their increased susceptibility to respiratory infection. Pneumonia, he says, is the most common cause of death, and influenza, nasal diphtheria, otitis, adenitis and pyelitis, as well as furunculosis and ulcers of the skin, are all associated with outbreaks of infantile scurvy. Moreover, he found that an epidemic of influenza in an infant ward precipitated the appearance of symptoms of scurvy in those on the borderline of this deficiency. It has been said that vaccination and the accompanying pyrexia may in the same way precipitate scurvy. An interesting observation was made by Funck[16] in the Sudan. He found that an epidemic of pneumonia which appeared when scurvy was common disappeared when antiscorbutic measures were instituted, suggesting that it was the lowered resistance associated with antiscorbutic deficiency which allowed the spread of the infection. Again Hehir[17] at the seige of Kut noted, like other army surgeons, the "baneful influence on the healing of wounds" exerted by scurvy.

If we turn to laboratory work, we find among those working with scorbutic animals almost unanimous agreement on their susceptibility to infection, both to spontaneous infections and to artificially induced infections.[18]

It is interesting, however, to remember that the various known immunological reactions have not up to now proved helpful in establishing the relations between dietetic deficiencies and susceptibility to disease. Even in the case of scurvy, where there appears to be fairly general agreement that resistance is reduced, the results of such reactions have been conflicting.[18]

VITAMIN-B DEFICIENCY

Let us now consider the vitamin-B complex.

Whether or not deficiency in the diet of any of the B-vitamins is common in this country is a debatable point, on which I have no good evidence to offer you, and consequently I will say very little about vitamin-B deficiency. Interesting observations have been published by Bray[19] in 1928 from an island in the Pacific Ocean, showing that when beri-beri occurs among babies the incidence of infections is greatly increased. As a result of prophylactic treatment and the widespread administration of a preparation containing the B complex, he found that instead of nearly every baby in the island requiring admission to hospital several times in the year for respiratory and gastro-intestinal infections, it became rare for a baby getting the preparation to need admission at all.

VITAMIN-A DEFICIENCY

We have briefly considered deficiency of vitamins B_1, C, and D from the standpoint of susceptibility to infections. What about vitamin A—often called the anti-infective vitamin? There is no doubt that laboratory rats suffering from a deficiency of vitamin A show a very high rate of infection with pyogenic organisms. It seems that the essential factor leading to these infections is an epithelial change—namely, a proliferation and keratinisation of epithelial layers in various parts of the body, associated with a change in the innervation of the epithelium, as demonstrated by Mellanby. These changes in the epithelium allow the entrance of micro-organisms, with resulting infections in sinuses, salivary glands, middle ear, and elsewhere. There is no doubt about the frequency and severity of vitamin-A deficiency in various parts of the world at the present day. Thus it is the commonest cause of preventable blindness in India where, I understand, the incidence of blindness is very high. It was, and presumably still is, responsible for a large mortality among Japanese children; it is

prevalent in China; and causes widespread night blindness among the fishing population of Labrador and Newfoundland, to mention some of the regions where the subject has been studied.[20] It has been found that an early symptom of this deficiency is a papular dry skin; 29 per cent. of children examined in vernacular schools in Ceylon were thus affected.[21] We may safely assume that in these areas vitamin-A deficiency is an important factor predisposing to infection. It would be interesting to know what part it is playing in the spread of the present epidemic of malaria in Ceylon.

What about the prevalence of vitamin-A deficiency in this country, and are any of the common infections among our people due to this deficiency? Apart from a group of about 100 cases of xerophthalmia and night blindness reported by Dawson in 1928–29 from Darlington, and smaller groups from another part of Yorkshire and from Newcastle-on-Tyne,[20] I know of no large group of proven cases of this disease in this country of recent years. The records of Stephenson [22] and others show that it was common among children in London at the beginning of this century. Since then the standard of diet in institutions and in working-class homes has undoubtedly improved, and severe vitamin-A deficiency is a rare disease. Probably the proof that an early symptom of this deficiency is a dry skin will bring many more incipient cases to light. I suggest, for example, that the boys observed by Corry Mann, whose dry skins regained their normal texture when they were given a daily ration of milk, butter, or watercress, were pretty certainly suffering from vitamin-A deficiency among their other dietetic defects.

As the question of the prevalence or otherwise of vitamin-A deficiency and of associated infections seemed one of considerable importance, I started an investigation about four years ago to try to determine whether a group of artificially fed babies (getting a type of feeding very common in this country) suffered from any deficiency of vitamin A.[23] This observation lasted about two years; and controls and babies getting extra vitamin A showed extremely little difference in any respect except one. That was in the incidence of infections of the skin. The skin infections were for the most part mild. I classified as infective skin lesions such conditions as the following: napkin rashes, dribbling rashes, and intertrigo, all of which may be regarded as due to micro-organisms of low virulence gaining an entrance as a result of some local irritation of the skin. These minor infections of the skin were about twice as common in the control babies as in the babies given extra vitamin A; and this difference was apparent in the seasonal subdivisions, as well as for each separate type of lesion. This to my mind strongly suggests that susceptibility to infections of the skin is a very early symptom of vitamin-A deficiency, and that such slight deficiency of vitamin A is probably common among those babies in this country who do not receive some extra supply of vitamin A, such as is provided by a cod-liver oil supplement. I am hoping, however, to get further evidence on the subject. It is interesting that when one looks up the reports of xerophthalmia and keratomalacia, bearing this aspect of the question in mind, one finds that the presence of skin infections is mentioned by a very large proportion of the writers.

When severe vitamin-A deficiency is present the records nearly always mention a high morbidity-rate from various infections, and undoubtedly A-deficiency itself is in part responsible, but as severe vitamin-A deficiency is only likely to occur on a diet containing little meat, fat, fish, eggs, milk, and milk products or green vegetables, it is almost always found in association with other deficiencies, which complicate the picture, so that it is impossible to assess the part played by each. For example, Bloch found that 80 per cent. of his group of 86 children with keratomalacia suffered from an infection of either the respiratory tract, the ear, the urinary tract, or the skin, but though he apparently attributed a principal rôle to vitamin-A deficiency, it seems that many of his cases suffered also from deficiencies of inorganic elements and of the vitamins D, C, and probably B.

There exists up to now, so far as I know, no satisfactory evidence that any of the common respiratory diseases occurring *in this country* are attributable to a deficiency of vitamin A, nor of the efficacy of vitamin A in the treatment of any of our common microbial infections. However, I fully expect that vitamin-A deficiency will be proved to be much commoner in this country than many of us had imagined.

CONCLUSIONS

What I have said is sufficient, I think, to show that in spite of the difficulties of the subject we have information to prove that British diets are often deficient in a variety of factors, and that a deficiency of any one of a number of different constituents of the diet will increase susceptibility to infection, and that the types of infection particularly associated with individual deficiencies may vary. Thus a deficiency of iron causes a baby to be more susceptible to all common types of infection, including respiratory infections and gastro-intestinal infections; a deficiency of vitamin D is probably particularly associated with infections of the respiratory tract; a deficiency of vitamin A leads to epithelial changes which facilitate the entrance of micro-organisms, so that skin infections are an early feature. I have talked only about one mineral deficiency and several vitamin deficiencies because I have tried to confine myself to certain deficiencies whose effects we are now able to recognise. Probably by degrees increasing knowledge will reveal a relationship between many different types of defective diet and various diseases whose ætiology is not yet fully understood. An interesting observation of this nature was recently described by Orr and Gilks [24] in two East African tribes whose markedly different diet was apparently reflected in the different diseases to which they were subject. The diet of one tribe consisted chiefly of milk, meat, and raw blood; the diet of the other of cereals, roots, and fruits. The latter tribe had a high carbohydrate diet low in calcium. The males averaged 5 in. shorter and 23 lb. lighter than in the meat-eating tribe, and their muscular strength, as shown by their grip, was 50 per cent. less. This tribe suffered from a high incidence of disease, including bony deformities, dental caries, anæmia, pulmonary disease, and tropical ulcers. The meat-eating tribe, on the other hand, suffered from a high incidence of constipation and rheumatoid arthritis. The part played by the diet as apart from race in the different physique and illness rate is not settled, but the possibility that diet is the ruling factor is very interesting, and opens up questions of fundamental importance to clinicians and public health officers alike.

In conclusion, it is scarcely necessary here to emphasise the fact that it is quite impossible for the wife of a man on unemployment benefit or getting relief from the public assistance committee to feed

her family adequately, unless she has some other source of assistance. If these defective diets are, as I believe, generally associated with increased susceptibility to infection, what must be the toll of disease, preventable by an adequate diet, in this country. Perhaps someone would like to work out the cash-saving to the nation if, say, our morbidity-rate could be halved. The consequent increase in happiness I will not ask you to imagine. Our knowledge of nutrition and our dietetic standards are fortunately much higher than 30 years ago—may our progress in the next 30 years be as great.

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MEDICINE AND THE LAW

A Question of Volition

MEDICAL practitioners and certain other professional men stand in a confidential relationship towards those who require their services. For this reason a gift from patient to doctor may sometimes be challenged in the law courts on the ground that the recipient could and did exercise undue influence over the giver. A recent action, where undue influence was alleged, is a reminder that the law is not so ready to interfere if the parties are husband and wife. Whether or no the idea is now too old-fashioned, it has been deemed natural to suppose that a wife would and should be guided by her husband's advice. In De Pret-Roose *v.* De Pret-Roose a wife sought to set aside a deed of separation (under which she agreed to pay her husband an annual sum) because of his alleged coercion and undue influence; she said he had induced her to sign the deed by a threat that he would otherwise remove the two children of the marriage to Belgium so that she would never see them again. The judge came to the conclusion that the husband did make a threat of some kind and that the threat operated upon the wife's mind and influenced her in the contractual arrangements which she made with him. But in the judge's view the separation deed could not be set aside unless the wife could show that, when she signed, her powers of volition were so paralysed by his words and acts that she merely gave expression to the will of the husband and not to her own will. Applying this test, the court found that in the preparation of the deed the wife was advised by her solicitor and never lost her own volition; she knew what she was doing and she intended to do what she did. Thus she failed to establish her case and her claim was dismissed with costs.

Threats would seldom be a feature of cases where undue influence is alleged against doctors or lawyers or other confidential advisers. The usual complaint in such instances is that the professional relationship has been too ingratiating rather than too minatory. As already explained, the relationship of husband and wife presents no legal parallel, except that in both classes of case the court is likely to be favourably impressed if the person who has conferred the disputed benefit had independent legal advice beforehand.

Needle Broken in Hypodermic Injection

In Gerber *v.* Pines a plaintiff and her husband obtained small damages without costs upon an allegation of professional negligence. Mrs. Gerber underwent injections for rheumatism; after six had been successfully given, the needle broke. This occurred on August 11th; the broken part remained in her body until the 16th, when it was removed by operation. As regards what happened after the needle broke, the doctor's case was that he had been warned by Mr. Gerber never to alarm the patient, that on that account he did not inform her of the accident at the time, and that, when he tried to inform her husband, he found himself unable to do so owing to a change of address. Clearly the most important allegation was that the doctor had been careless in handling the needle. Mr. Justice du Parcq, who tried the case without a jury, found no reason to suppose that the doctor's advice had been negligent or that the breaking of the needle was otherwise than accidental. There was always, he said, the possibility of an involuntary spasm; he thought that this had occurred and had caused the needle to snap. The judge found no evidence of any lack of skill or care. But then came another side of the case. Dr. Pines knew at once that the needle had broken off and that the broken part remained in the patient's body. The judge ruled that a patient in whose body a doctor finds that he has left some foreign substance is entitled to be told at once. There might be exceptions to this general rule; it might very well be that Dr. Pines, having been cautioned by the husband not to alarm the patient, might be justified in telling the husband before he told the wife. If so, it was important that the doctor should have told either the patient or her husband before the patient left the surgery. The patient went home by omnibus, and there was a risk that the needle might have shifted. The judge did not think the doctor took every reasonable step to perform the duty of informing the patient or her husband. Mrs. Gerber had given him the address of 4, Marylebone-road, and had been unable to tell him the telephone number. The doctor had afterwards tried to find her number in the telephone directory in vain; he had always conversed with her in Yiddish and knew her as Garber, not Gerber. He went to 4, Marylebone-road but failed to find the family there. Mr. Justice du Parcq at one stage of the case observed that he did not think it was any breach of duty for a doctor not to make a note

of his patient's address. In delivering his final judgment he said that it would have been simple for Dr. Pines to look in the telephone directory while Mrs. Gerber was still in his surgery. He would then have found that no one named Garber was at 4, Marylebone-road, and a little further inquiry would have enabled him to discover the correct address. "There was a breach of duty and negligence on the doctor's part in not at once informing either the patient or her husband on the day of the accident." The damages, said the judge, must be small; apart from certain out-of-pocket expenses, the plaintiff was entitled to be compensated for her pain and suffering on the few days between the accident and the subsequent operation for removal of the needle, since the doctor's omission to give the information had caused delay in operating. A fair amount to award, said the judge, would be five guineas. He gave judgment for that amount, depriving the plaintiff of costs because her claim had failed on the greater part of her case.

VIENNA

(FROM OUR OWN CORRESPONDENT)

UNEMPLOYMENT AND NEUROSES

FOR the past two years there has been a distinct and ever-increasing preponderance of men among the patients who attend the five principal psychotherapeutic clinics in Vienna. This increase is attributed to the mental instability caused by unemployment which is more dangerous to men than to women, for women even though unemployed are better able to find occupation in the home. The chief cause of nervous disease, it is thought, is a lack of self-discipline and of social feeling which makes the patient forgetful of his duties towards his family and his surroundings, and treatment aims at restoring to the patient his sense of social duty. The typical neurotic conditions met with are anxiety neurosis, sexual neurosis, hysteria and depression, and attempted suicides are common. The first two forms are more frequent in men; in women the organic neuroses are prevalent, though the rarity of cases of sexual neurosis may be explained by a feeling of shame or an ignorance of what is really the matter with them on the part of the patients. The results given are 13 per cent. cured (that is, fit again for work); 29 per cent. improved, or fit for some light work; 30 per cent. only fit for an institutional life; while the remainder drift away and are lost sight of.

PROFESSIONAL SECRECY

In a recent penal case in a Vienna court a ruling was given on the old problem of professional secrecy. It was laid down that in a criminal case the practitioner is bound to give any information required by the court or magistrate. He must also report notifiable diseases or injuries caused by violence. This is no violation of professional secrecy. In civil litigation the doctor may disclose any facts brought to his knowledge through his professional services to a patient at the patient's request and to persons whom the patient names—i.e., a life insurance company or in a claim for damages due to an accident. Professional secrecy only protects a "secret"; that is to say, facts which may properly be kept secret and which may if published cause harm to the interests of the patient. If the suppression of a "secret" might cause injury to a third person (infectious disease of a wet nurse or of a bridegroom) the third person should be warned. Any doctor who infringes these rules will be struck off the Medical Register for three months for a first offence, for a year for a second offence, and for ever if he commits the offence a third time.

PARIS

(FROM OUR OWN CORRESPONDENT)

SEA-SICKNESS AND EMPIRE

THE senior medical officer of the liner *Ile-de-France*, Dr. J. Bohec,[1] has discovered the secret of the genius of the English for travelling and colonising. They have refused to recognise sea-sickness. That is all. "La mentalité anglaise répugne au mal de mer comme à une faiblesse inavouable." The Frenchman, on the other hand, fears sea-sickness and confesses to this fear. The Englishman's attitude is one of disdain and indifference; the Frenchman's is one of scepticism which is extended to the ability of medicine to combat sea-sickness effectively. Yet Dr. Bohec has come to the conclusion that sea-sickness can now be controlled by the doctor who distinguishes one type of sea-sickness from another and suits his therapeutic activities to the varieties of his diagnoses. But there must be no blunderbuss empiricism. As for the proprietary remedies, their diversity betrays their failures. Besides, the dosage of their active principles is too timid. Only the doctor can deal effectively with this trouble. Dr. Bohec begins by distinguishing between ordinary sea-sickness, which is a hypervagotonic crisis, from the other forms which are the sympathicotonic, amphoneurotonic, hypersympathicotonic, and psychic or mental forms. To this end, note must be taken of the symptoms, the vagosympathetic reflexes, the blood pressure, &c. Having made his choice between this impressive list of diagnostic alternatives, the doctor proceeds to action, and if he is too late to prescribe prophylactic measures—and this has been known to happen—he may yet reduce the duration of acute suffering to a few hours if he adopts the hypodermic mode of medication. Dr. Bohec first used belladonna and its alkaloids many years ago; and when, in 1925, Prof. Stoll of Bâle published his observations on lævorotatory hyoscyamine, he began to use this drug, and the total extracts of belladonna when he wished to deal with the vagus, giving ergotamine when he desired an effect on the sympathetic. If drug treatment is ineffective, either the wrong drug has been chosen or its dosage is inadequate. Voilà tout.

NEGATIVE TUBERCULIN REACTIONS IN A TUBERCULOUS MILIEU

The Michelin factory at Clermont-Ferrand, a medium-sized town, has established a dispensary at which some instructive investigations have recently been conducted. Among 1481 children between the ages of 3 months and 15 years the percentage of positive tuberculin reactions rose from 16 under the age of 1 year to 44·7 between the ages of 12 and 15. Similar tests recently carried out in Paris itself have yielded 79·7 per cent. positive reactions between the ages of 14 and 15. The comparatively high ratio of positive reactions in Paris may well be due to its slums, which can bear no comparison with such a model town as Clermont-Ferrand. But how to explain the negative tuberculin reactions of 28 children belonging to 22 tuberculous families? When the reaction was repeated some time later it was still negative, although in several cases the tuberculosis with which the children were in contact was certainly open. Dr. J.

[1] Echos de la Méd., Nov. 15th, 1934, p. 1.

Stiassnie,[1] who records these observations, does not think that they detract from the value of the Pirquet test, from whose evidence he concludes that these children had escaped infection. But that, surely, remains to be seen.

TYPHOID AND OTHER INFECTIONS

The comparatively high death-rate in France is evidently due in part to faulty public health measures. In his survey for 1933, delivered at a recent meeting of the Academy of Medicine, Louis Martin, the new head of the Pasteur Institute, said that of 38,007 communes, only 10,657 are provided with potable water. The fact that more than 2000 communes have been provided with such water within the last three years shows that the authorities are alive to its importance. In some areas there are two water-supplies, only one of which is potable; but the trouble with such a system is that anastomoses are sometimes established between the two, and in a certain large port it is very difficult to distinguish the two supplies by their degree of purity. A further objection to such a double system is the temptation it offers to economise by turning the wrong tap.

[1] Rev. de la Tuberc., October, 1934, p. 821.

Dr. Martin also referred to certain seaside communities who add typhoid fever to their holiday distractions; and as holiday-making by the sea has become a convention, the alternative of typhoid vaccination must be considered. But the best measure would certainly be the provision of water which was really potable. As for undulant fever, notified only in 17 Departments in 1925, its extension has been such in the interval that it has now been observed in 57 Departments. Energetic prophylactic measures are required to meet the extension of this disease which constitutes a very real danger to agriculture and public health. Be it noted, however, that only in a very few cases has the milk of sheep and goats been incriminated. As for diphtheria, it continues to be prevalent, although it is the most conscientiously notified and effectively combated of all the infectious diseases. In the Department of the Rhône, it has been noticed that a decline in the morbidity has always followed the vaccination with anatoxin (toxoid) of two-thirds of the children in a community; but if less than half of them are vaccinated, there is little change in the morbidity. A commission has been appointed by the Academy to study vaccination against diphtheria.

OBITUARY

ARCHIBALD CAMBELL, M.B., Ch.B. Manch.

THE death occurred on Dec. 14th at Southsea of Dr. Archibald Cambell, a general practitioner whose work in Portsmouth and the district in the treatment of venereal disease gained him high and well deserved credit.

Archibald Cambell received his medical education at Owens College, Manchester, and graduated as M.B., Ch.B. Vict. Manch., in 1905. After holding minor appointments, among others that of clinical assistant at the Hospital for Diseases of the Skin, Blackfriars, he settled in general practice at Portsmouth. In 1914 he joined up immediately and saw active service in France, and became here keenly interested in the prevention and treatment of venereal diseases. He was appointed venereal specialist and dermatologist at the military hospital at Hilsea, later being placed in charge of a new venereal diseases clinic opened in 1917 in Portsmouth. He filled these two appointments with conspicuous success, the latter one until just before his death. He showed himself to be a first-class organiser; we have the testimony of one of his colleagues to the effect that the venereal diseases department at Portsmouth is a model of efficiency, while the work done there has received special commendation from the Ministry of Health. As a result Cambell became known far beyond the limits of Portsmouth as an authority on venereal disease; both as pathologist and therapeutist he was sound, while he showed ingenuity in the invention of instruments for use in venereal practice—as an example we may mention an aero-urethroscope which he described in these columns in 1918, and a vacuum bougie, described in the columns of the *British Medical Journal*, for use in the treatment of chronic gonorrhœa. The practical outcome of his labours in Portsmouth must have been very gratifying to him for in 1931 he had the satisfaction of seeing the city rank third lowest of the 20 largest towns in the country as regards the attack-rate of venereal disease. He was also particularly active in the care of children congenitally affected, and under his treatment many who might have been permanent victims were able to grow up as healthy members of the community.

Dr. Cambell, in addition to his skill and punctilious care in the discharge of his duties, gained the high regard of both the medical profession and public by his personal kindness and sympathetic manners.

HORACE SMITH, M.D. Camb.

Dr. Horace Smith, who died on Dec. 4th, had a successful career as a student. An exhibitioner in natural science at Trinity College, Cambridge, he graduated in the first class of the Natural Science Tripos in 1888, taking the M.B., B.C.; he did his clinical work at St. Mary's Hospital, London, and proceeded to the M.D. in 1898. At St. Mary's Hospital he filled the post of house surgeon, and was then for a time honorary physician at the Boscombe Hospital but he retired early from the medical profession only to return to it on the outbreak of war when the volunteer regiment to which he belonged became the 7th Battalion of the Hampshire Regiment. He was 67 years of age at the time of his death.

FREDERICK SPICER, M.D. Durh., F.R.C.S.I.

THE death occurred on Nov. 7th of Dr. Frederick Spicer, one of the small but increasing number of medical men who are also members of the Bar. He received his medical training at St. Bartholomew's Hospital and the University of Durham, where he graduated in 1883, proceeding to the M.D. in 1885 and securing a gold medal at the examination. After qualification he acted as house surgeon to the Royal Free Hospital, and later as registrar at the Central Throat and Ear Hospital. The latter appointment directed his attention to a special branch of surgery, and he graduated in 1905 as B.S. Durh. and four years later became F.R.C.S.Irel. He made practical contributions to the laryngeal section of the Royal Society of Medicine, and was elected to the staff of the Metropolitan Ear, Nose, and Throat Hospital, where he was senior surgeon at the time of his death.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

UNEMPLOYMENT ASSISTANCE

The New Scales of Relief

IN the House of Commons on Dec. 17th Mr. OLIVER STANLEY (Minister of Labour) moved that the draft Unemployment Assistance (Determination of Need and Assessment of Needs) Regulations, 1934, made under the Unemployment Act, 1934, be approved. The proposed scales, he said, were the result of a very careful survey by the Unemployment Assistance Board of the primary needs of the people for whom they had been made responsible. There were very great differences in the results which had been arrived at by the different social surveys, but in deciding whether the Board had succeeded in their task or not it was not fair to pick out the best bits from each of those scales and put them all together into one scale with which to compare the Board's scale, to the great disadvantage of the latter. In the spring of this year there was a hotly contested debate and even a closely contested division, on the question whether a child should receive 2*s.* or 3*s.* In the new scale the minimum for any child under 5 years of age was 3*s.* and that amount increased with the age of the child, which was a new principle. This was the first time, he thought, that the distinction had been made on the proper basis, which was that the older the child the more it needed and the more it should receive. Hon. Members would agree that in comparison with the old scale under which the vast majority of those on transitional payments had been dealt with, this new scale for a family with children was an immense improvement.

He had received that day from the Children's Minimum Committee certain criticisms on the subject of the scale for children. They frankly admitted, with all the criticism they had to make, that the scale represented a great advance on what had gone before. However, they attempted to make out a case for a higher rate, claimed that the scale was still inadequate, and gave figures to form a comparison between the British Medical Association's scale for food and the Merseyside scale for such things as fuel, light, and clothing, and the scale adopted by the Board. It would have been possible to take the Merseyside survey as the basis for the whole of the need, including food. Were that done, it would be found that the Board's scale for a man and wife and three children was higher than the scale laid down in the Merseyside survey. With regard to the B.M.A. scale, he did not pretend to be sufficiently a scientific expert to say whether that scale, or the scale produced by three or four other surveys was the theoretically correct one. It did happen that the B.M.A. scale, which had been selected for comparison, was very much the highest in the matter of food. One of the reasons why the British Medical Association scale for food was so much higher than any other scale was the very large provision which it made for milk. The B.M.A. scale, and the costing of that scale, were drawn up before the scheme for the provision of cheap milk in schools was produced and the scale required revision in view of the fact that the milk, which formed such a large part of it, could now be got elsewhere.

Dealing with the question of the treatment of resources other than earnings, Mr. Stanley said that with regard to milk and school meals the basis which the Unemployment Assistance Board were going to adopt in the first instance was as follows: All meals given on a doctor's certificate that a child was suffering from a specific physiological condition and required extra nourishment were to be set off against the personal medical requirements of the children and ignored. The next provision dealt specifically with milk or other special provision, such as cod-liver oil, which was to be entirely ignored. The provision of meals up to two per day for a single child in a household, or one meal for two children, would be ignored, as constituting a negligible saving to the family. That was to say, 12 meals in the week in the household were free. After that, some deduction was to be made in respect of those meals, which worked out at roughly 1*d.* a meal. As regarded medical relief, maternity and child welfare, and tuberculosis services, any payments or allowances in kind under those services would be regarded as being set off by the special needs, and would, therefore, be ignored. In the case of old age pensions, widows' and orphans' pensions and blind pensions under the Blind Persons' Act, 1920, any balance after providing for the pensioners needs at the scale rate would be allowed for personal requirements where there were no other resources. In other words, in those cases, it would be ignored.

THEIR ADEQUACY CHALLENGED

Mr. GREENWOOD, for the Labour Opposition, moved an amendment to the effect that the Regulations would be inadequate to ensure the maintenance of unemployed persons and their dependents in health and physical efficiency. Referring to the adequacy of the scale, he said that Mr. Stanley tried to dispute the validity of any kind of comparisons. The right hon. gentleman said, "Of course, if you accept the B.M.A. scale you should accept it for everything. If you accept the scale of the Merseyside Social Survey Committee you should accept it for everything." His (Mr. Greenwood's) reply was that as regarded the question of ascertaining the food values and human needs as regarded food, it was far better to place reliance on the B.M.A. than on a non-medical body like the Merseyside Survey Committee. While he complained about the price that the British Medical Association put on their food values—it was not their job to do that—they were entitled to say as regarded food needs that there was no higher authority that they could accept than the British Medical Association. As regarded other needs, he was prepared to accept the Merseyside Survey Committee's report, because they were dealing with things within their knowledge, and that would not apply to the other elements in the cost of living if the British Medical Association had tried to elaborate the scale.

The first point in regard to the B.M.A. scale was that examinations which had been made by working-class women of experience, who could be relied on to buy in the best possible market, showed that it was impossible to buy the amount of food laid down in the B.M.A. scale at the price suggested by the British Medical Association. He would quote a case in point, where the Medical Officer of Health for the Lancashire town of Middleton, said that the prices were higher within that area than those in the B.M.A. scale. He estimated that it would need 24*s.* in the town of Middleton to buy the food which the British Medical Association said could be bought for £1. That meant that the estimate of the B.M.A., not in terms of values, but of the money needed to buy that food, was about 20 per cent. wrong, because the prices were 20 per cent. higher than they estimated.

He (Mr. Greenwood) was not blaming the B.M.A. for not being able to change calories into pounds, shillings, and pence, but he could give the House a list of places showing that the scale of the British Medical Association measure in money was hopelessly below what would actually be possible. In some towns it would need 25*s.*, 26*s.*, or 27*s.* to buy the amount of food which the B.M.A. suggested could be bought for £1. In the Seaham division the price that would have to be paid for £1 of foodstuffs on the B.M.A. basis would require something like

22s. 6d. That made any disparity between the Unemployment Assistance Board's scale and the British Medical Association's scale all the greater, because the amount of food which the British Medical Association suggested could be bought for that amount of money could not be so bought. It was clear to those who had examined the regulations, and gone through the scales and tried out various sizes of families, which he had spent part of his week-end in doing, that there was a very considerable disparity in many cases. He was certain that if the B.M.A. scale was examined as it stood, not subject to a 20 per cent. increase in costs, it would be found that there was a serious disparity between that scale and a reasonable allowance for the barest physical needs of life, which meant that the Government were not meeting the minimum physical requirements of the people, which was what they set out to do. He could not understand the attempts of supporters of the Government to prove that malnutrition did not exist. He was not going to pretend that we were on the whole a C3 nation, and that there was evidence of malnutrition everywhere, but he said that when people tried to belittle the effects of malnutrition they were not acting in the public interest. It was the Chief Medical Officer of the Ministry of Health who said that malnutrition should be judged objectively; he did not see the cases, but the Labour Party had a certain volume of evidence that under the existing standards of unemployment insurance benefit or transitional payments, numbers of people, especially young people, were suffering from malnutrition, and, unless the scheme was sufficiently generous to meet all reasonable physical needs, the amount of malnutrition which existed to-day would increase.

On Dec. 18th Mr. JAMES REID said that the increased benefits to children were substantially accepted as going very nearly the whole way to meet the case of the Labour Party. The scales and the regulations for adults were in every case higher even than the scale put forward by the British Medical Association. The Government were entitled to say on the highest medical authority that the scales which they proposed were fully adequate for all adults.

Mr. MANDER said that some reference had been made to the scale of the B.M.A. They wanted in those matters to be up against scientific realities. What better test could they apply than exact knowledge worked out by experts of the amount required to maintain a person on a decent level of subsistence? The B.M.A. scale under-stated rather than over-stated the cost. It seemed to him to be a very severe criticism of the regulations that there was a gap of 1s. 8d. between the regulations and the B.M.A. scale, and in the case of five children a difference of 8s. 3d. That alone was a ground for rejecting the regulations.

Miss RATHBONE said that Mr. Oliver Stanley had tried to belittle the figures presented by the Children's Minimum Committee by suggesting that it was not quite fair to pick out the best bits of the different estimates and after putting them together to point out that the Board's scales by comparison showed a deficiency. That was not what the Children's Minimum Committee had done. They took the British Medical Association's scale for food, not because it was the highest scale but because it was the most authoritative, and because its findings were in substance endorsed by the Minister of Health's own Committee on nutrition. If the Minister disputed the authority of the joint British Medical Association and Merseyside surveys would he tell the House on what the Board's own scales were founded? Her own impression was that all these scientific scales tended rather to under-estimate than over-estimate needs.

APPROVAL OF SCIENTIFIC METHOD

On Dec. 19th Sir FRANCIS FREMANTLE said that this was a great measure dealing with a very great problem. The scientific method of setting out an analysis with the different factors provided a machine capable of very great development for the future. There was far more elastic machinery in this than in any other of our social services hitherto. It was very remarkable that it should come into force in 1934, exactly a century after what was considered the greatest reform of its time, the Poor Law Reform Act, 1834, although this scheme would have to undergo, he expected, as long a series of changes as the other Act did.

Constant references had been made to the scale of the B.M.A. and other scales, and general figures had been given which were 5s. to 6s. for a man and from 4s. to 5s. for a woman according to the particular scale adopted. As regarded growing children the regulations made a difference, but he thought that was a case where really a little further elaboration was needed. This was one of the most difficult points that was raised by the B.M.A. and it was one about which the medical officers of health felt very strongly. He (Sir F. Fremantle) was at a meeting of the Council of Health Education at which Prof. Nixon gave a very important and instructive address on the question of nutrition. It was surprising to learn what a very large amount of food was required by infants in comparison with their weight. In the ordinary way the actual requirements of an infant was 50 calories per lb. of body-weight, while the adult required only 20. The actual amount allowed in the scale for cost of food was 2s. 6d. for the infant, or only about half as much as was provided for the child between 12 and 14—namely, 4s. 6d. The growing child's requirement was really heavy, and it was a serious question whether the scale, if it was rigidly followed, would provide a sufficient allowance for the children. As regarded the cost of food he did not think it was sufficient, but there were other overhead expenses which did not reach anything like the same amount in the case of a child. One could not generalise on the subject, but the criticism that was generally made by those who had gone into this question from the point of view of the B.M.A. and the medical officers of health was that, while the scale which had been laid down was on the whole a generous scale and met the case of a family consisting of a man, his wife, and two children, yet, where there were more children than that, it tended to be rather below the standard that was required, according to the B.M.A. There were, of course, different standards. The Children's Minimum Committee had done splendid work in this direction, but their report did not mention the scale laid down by the equally and perhaps more efficient Advisory Committee on Nutrition appointed by the Minister of Health. It had been suggested that the Minister had hurriedly appointed that committee after the Committee of the B.M.A. had reported, but, as a matter of fact, the Advisory Committee was originally appointed in 1931 to deal with the whole question of food and nutrition. It was a Standing Advisory Committee. It put forward a lower scale considering that 3000 calories were enough for a man as compared with the B.M.A. figure of 3400. There being this discrepancy, the two committees met, and the result of their conference was shown clearly in the report of the Ministry of Health last year. Those two bodies of men, who were colleagues, knowing one another well and respecting each other's opinions, discussed the difference between their findings and decided that the all-round average requirement for the entire population, or for large mixed groups of people, at the present time, was about 3000 calories a day, against the B.M.A. figure of 3400, and that figure, they said, could be safely employed for the calculation of mass requirements, but would not necessarily be applicable to individuals or single families whose condition might require separate treatment.

Miss RATHBONE asked if it was not the case that the unemployed household in which the man was actively seeking work was rather in the position contemplated

by the scale of the British Medical Association than that contemplated by the Advisory Committee. Was it not explained at the conference that there was no real difference between them, but that the British Medical Association's scale was more apposite to the unemployed man who was seeking work?

Sir F. FREMANTLE said that he thought their actual conclusion was that the Advisory Committee's figure of 3000 calories was right for a man who was not engaged in work at the time, and that the British Medical Association's figure of 3,400 was right for those who were actually employed. That was roughly the division between them as it was summed up at the conference. Anyhow, the scale which the House was now discussing was within the general requirements for the population. It might need revision in certain directions, especially as regarded the children of larger families. The larger families were still part of the problem, but that was no reason why they should not be dealt with, and he hoped they would hear from the Government spokesman in regard to the possibility or probability of revision of these regulations. It was left vague in Section 52 of the Act.

Apparently the Board was to report to the Minister from time to time. How soon was the first time going to be? He hoped that members would not expect it to be as soon as had been suggested. Three months would be absurd, because there was not time to get settled down, but within a certain time they ought to be able to have some idea how the scales were working. They could only agree to these being proper scales with which to begin if they recognised that, in the first place, they were going to be adjusted in accordance with special circumstances and, in the second place, that they would be open to revision. In those conditions it seemed a proper experiment to make. Another point that the B.M.A. particularly wanted to have recognised was the provision in the regulations to meet large families in the economic sense of making a reduction for quantity in payment per head. It was reasonable to make some such suggestion. When the family was large there should be a reduction in the allowance per head when the family was living within its income, but, if the family was living on the absolute minimum, there was very little reduction possible. After all, these were cases which, to a large extent, were living on a very small margin, so the reduction per head for quantity was a very serious difficulty with them. At the same time, they rested on the assurance that there was to be adjustment in special cases.

He asked hon. Members not to rely so very closely on these actual determinations of food values in calories. At the conference which had been referred to, one of the professors who spoke poured cold water on the whole question of calories, and showed how little they could trust to them. They knew that a great deal depended on the quality of the food and on digestion, and so on, and it was difficult to lay down actual figures. He suspected these standard diets, but it was the only way in which they could arrive at some systematic arrangement for feeding people. But they must recognise how very open to criticism they were, and how very little they met realities. They knew that the value of food depended very largely on a mysterious essence called vitamins, and lots of those foods would be perfectly useless if they had not a sufficient amount of vitamins. If they had good digestion and fresh food they could get on with a good deal less than the standard as laid down. What they must have all the way through in carrying out these regulations was the human touch. If they were going to have elasticity in administration they were going to have that human touch. If they had it, all might be well, and he believed all would be well, but it would require to be watched. He was not going to mention the question of rent. They all recognised the enormous possibilities for good, and also for bad, if it was not properly worked out, which lay in laying down a definite standard of rent with all the adaptations which would be possible. What actual coöperation was there going to be between the Board of Education, the Ministry of Health, and the Unemployment Assistance Board in the actual working out of these tests? There were various ways in which one Government could help another. For instance, if they were really looking about for cases of malnutrition in an early stage they wanted the medical officers of the Board of Education to advise the officials of the Unemployment Assistance Board of families which cases seemed to them to require assistance. In the same way, were the officials of Employment Exchanges going to be asked to draw the attention of the Board to cases which seemed to require need? He only made that suggestion as being a later development. If they compared the conditions in this country with those in any other and the advance made in this country with conditions in the past, they had every reason to feel that we were doing the right thing. We were leading the world in this experiment. We had gone ahead greatly in the last 20 years, and he thought we would go ahead still more on the lines of these regulations.

MINISTERIAL REPLY

Mr. R. S. HUDSON, Parliamentary Secretary to the Ministry of Labour, replying to the debate, said that the figure quoted for the typical family of a man, his wife, and three children in the green document circulated by the Children's Minimum Committee some little time ago did not correspond with the figure given in the British Medical Association's scale. The British Medical Association's figure was 20*s*., and the figure quoted in the document was 21*s*. 8*d*.

After further debate the Labour amendment was negatived by 286 votes to 75, and the regulations were approved by 260 votes to 47.

DEBATE IN THE UPPER HOUSE

In the House of Lords on Dec. 20th, when the regulations came up for consideration, Lord MARLEY said that figures in a letter to the *Times* on Monday last showed the deficiency of the Unemployment Board's scale of allowances per child compared with the scale laid down by the British Medical Association and the Merseyside scale. The scales laid down in the regulations were likely to affect the heads of the families which came under them. They were inadequate for building up healthy, strong, and capable future citizens. They were shillings per week below the British Medical Association scale, which was itself founded on a price level which few of their lordships would be able to put into effect if they had the spending of the money.

Lord ROCHESTER, Paymaster-General, said that with reference to the difference between the scale of the Unemployment Assistance Board and the British Medical Association, the question had been considered at a conference attended by representatives of the Ministry of Health and the British Medical Association. The conference had deplored the exaggerated importance that had been attached to the alleged disagreement between the two committees which had drawn up scales. It had stated that there was no fundamental disagreement between the two bodies on any matter of scientific importance. The Board scale, taken as a whole, compared very favourably with the average of those other scales to which reference had been made. The regulations were at least a distinct advance on anything which had previously been enacted.

The draft regulations were agreed to.

Petition against Vivisection

In the House of Commons on Tuesday, Dec. 18th, Mr. ISAAC FOOT presented a petition signed by 5102 persons which stated that, believing vivisection to be morally unjustifiable, scientifically useless, and dangerous and demoralising to the community, the signatories earnestly prayed the House to pass a

Bill withdrawing the sanction of the law to this practice.

HOUSE OF COMMONS

TUESDAY, DEC. 18TH

Viscountess ASTOR asked the Minister of Health how many local authorities empowered under the Maternity and Child Welfare Act of 1918 to set up maternity and child welfare centres had, up to the present, taken no action.—Mr. SHAKESPEARE (Parliamentary Secretary to the Ministry of Health) replied: According to the latest information available to my right hon. friend's Department, four of the 422 maternity and child welfare authorities in England and Wales have not yet set up maternity or child welfare centres, and 46 others who have provided welfare centres have not yet set up separate antenatal clinics. In some of these areas there are, however, voluntary clinics working in harmony with the local authorities, and in others of a rural character, where the provision of clinics is not practicable, arrangements are made by the local authorities for antenatal supervision by general practitioners.

Viscountess ASTOR: Can the Minister do anything to bring the authorities who have not taken advantage of the Act of 1918 up to date and make them set up clinics?

Mr. SHAKESPEARE: The noble lady will recall that we have sent out a circular of reminder to every one of these authorities. I trust that in the course of the next year many of these authorities will set up clinics.

WEDNESDAY, DEC. 19TH

Maternal Mortality

Mr. GLEDHILL asked the Minister of Health the figures of maternal mortality for the last three complete years in Halifax, Huddersfield, and Bradford, and the average maternal mortality-rate in each of these boroughs for the past ten years.—Mr. SHAKESPEARE replied: The following is the statement asked for:—

Year.	Halifax county borough.		Huddersfield county borough.		Bradford county borough.	
	Per 1000 live births.	Per 1000 total (L.S.) B.	Per 1000 live births.	Per 1000 total (L.S.) B.	Per 1000 live births.	Per 1000 total (L.S.) B.
1931	3·21	3·10	4·99	4·73	4·91	4·68
1932	9·25	8·75	5·19	4·88	5·97	5·69
1933	10·94	10·28	9·24	8·81	4·87	4·65
Average 1924 to 1933	7·19	—	5·73	—	5·35	—

(L.S.) B.=Live and stillbirths.

During the decennium 1924–1933, the basis of maternal mortality rates was changed from live births alone to the total of live and stillbirths. As figures for the earlier years of the decennium are available on the original basis only the 10 years' averages have been calculated upon that basis; and for purposes of comparison the figures for the last three separate years are given upon both bases.

Ministry of Health Consultative Councils

Mr. LLEWELLYN-JONES asked the Minister of Health what consultative councils were originally established in England under Section 4 of the Ministry of Health Act, 1919; which of these councils still continued to function; how many members there were on each of the existing councils; and how many meetings of each of the councils had been held in each of the years 1932, 1933, and 1934 respectively.—Sir HILTON YOUNG replied: The answer to the first question is four, and, to the second, the Consultative Council on National Health Insurance (Approved Societies' Work). This Council has 39 members and met twice in 1932, and once in each of the years 1933 and 1934.

Milk-supplies to Necessitous Children

Mr. WEST asked the Parliamentary Secretary to the Board of Education whether necessitous children must now have a medical certificate before they could be supplied with milk by a local authority.—Mr. RAMSBOTHAM replied: It is presumed that this question refers primarily to the provision of milk for children attending public elementary schools. The method of selection at present varies in different areas, but the board have urged that a medical basis should be adopted as being in accordance with the intention of Section 84 of the Education Act, 1921, and the most effective means of securing that school meals, whether in the form of solid food or milk, are supplied to those children who need them. It is not necessary for a medical recommendation to be given before a child is supplied with free milk, as children may be given milk provisionally pending a report by the school medical officer.

Noxious Fumes from Battersea Power Station

Mr. ALAN TODD asked the Minister of Transport if he was now in a position to make a report on the emission of smoke and noxious fumes from the new Battersea power station, in the light of his pledge to the borough of Chelsea and the city of Westminster on this matter.—Captain HUDSON (Lord of the Treasury) replied: A further report by the Government Chemist's Committee is now being printed and will, my hon. friend hopes, be presented to Parliament this week.

THURSDAY, DEC. 20TH

Partially Sighted Children

Mr. ERNEST EVANS asked the Parliamentary Secretary to the Board of Education whether it was the intention of the Government to take any action on the report of the committee of inquiry into problems relating to partially sighted children.—Mr. HERWALD RAMSBOTHAM replied: The Board of Education are in general agreement with the report of the Committee on Partially Sighted Children and are taking steps, as opportunity arises to give effect to the committee's recommendations.

Cheap Milk for Nursery-Schools

Mr. DAVID GRENFELL asked the Parliamentary Secretary to the Board of Education whether he was aware that the present policy of refusing to sanction any expenditure on nursery schools had the effect of debarring these schools from participating in the scheme for cheap milk; and whether he would consider the desirability of taking whatever step was necessary to bring these nursery schools within the scheme.—Mr. HERWALD RAMSBOTHAM replied: The hon. Member appears to be under a misapprehension, as it is not the policy of the Board of Education to refuse to sanction any expenditure on nursery schools, and those schools are not debarred from participating in the scheme for cheap milk. An increasing number of grant-earning nursery-school sare eligible to participate in the scheme, which does not, however, apply to schools of any type which are not recognised for grant.

Refuse Disposal at Brighton

Sir F. FREMANTLE asked the Minister of Health if his expert officers had inspected the Brighton system of disposal of refuse by incineration in trenches and had given him any estimate as to its claim for efficiency, amenity, and economy.—Sir HILTON YOUNG replied: The system referred to, known as the "Feoenix" (see THE LANCET, Dec. 8th, p. 1321), has been inspected twice by my officers, in 1926 and in 1933. No local authority has so far applied for my sanction to a loan for installing the system. If a local authority should apply for my sanction, I should form my judgment on the application in relation to the needs and circumstances of the particular authority; but I could not with advantage form a judgment unrelated to actual circumstances.

ROYAL SANITARY INSTITUTE.—A sessional meeting of this institute will be held at the Guildhall, Guildford, on Friday, Jan. 18th. At 5.45 P.M. Dr. F. A. Belam will open a discussion entitled "What is Scarlet Fever?" and Mr. J. W. Hipwood will speak on the Waters of Guildford—Pure and Impure.

MEDICAL PRACTITIONERS' UNION.—Application made by this union on Dec. 14th for affiliation to the Trades Union Congress was acceded to by the Congress on Dec. 19th. The action was taken, we are informed, in the interest of members of the Practitioners' Union employed by county and municipal authorities.

CORRESPONDENCE

THE HEALTH OF MERCHANT SEAMEN

To the Editor of THE LANCET

SIR,—The discussion on help for shipping in the House of Commons reported in the *Times* of Dec. 15th and THE LANCET of Dec. 22nd became of interest to the medical profession when the Labour Party raised the question of health conditions of merchant seamen. It involved a dispute between Dr. Addison and Mr. Runciman, apparently old antagonists in 1917, and still at cross purposes. Dr. Addison for his statements, so far as I can see, was relying on the Board of Trade's octavo Blue Book of 1932: "Statistics relating to mortality in the Mercantile Marine," which revealed for the first time the surprisingly increased mortality of seamen just when they leave the service; and Mr. Runciman countered by quotations from the provisional conclusions of the committee in Paragraph (7) (quoted in THE LANCET, Dec. 22nd, page 1422) as if definitive. Dr. Addison quoted from the very exceptional, indeed unique, report which discussed the deaths of merchant seamen, employed and unemployed and retired, between Oct. 1st, 1929, and Sept. 30th, 1930. Here of men employed at sea, 127,518 of them, 642 died in the year, most of them from accidents, while of the others 622 died within a year of leaving the service, comparatively few from accidents.

The deaths of the 642 were reported to the Board of Trade, but not those of the 622, where the reports went only to the local registrars. But with a view to this Blue Book the Board of Trade had got from the registrars the forms on which each death individually had been entered. These Mr. Runciman kindly let me examine, and my results were printed in THE LANCET, August 19th, 1933, p. 440. I found that from disease 288 employed died in the year, but, within a year of becoming unemployed, 556 of the men unemployed or retired died. Thus in three months, a quarter, 72, of the employed died, but within three months of leaving the service 267 of these others died. Of pneumonia in an ordinary quarter 8 employed would die, but 44 of the others in their first three months after leaving. Of 127,518 men, 6 per quarter died of tubercle in the active service, but of the clearly much smaller number who retired, 29 died of tubercle within three months of leaving. Now who will condemn me if I say that all 29 must have been infected before leaving the service and while yet in the service?

In the service 24 men died of tubercle in a year, out of the service in that same year 110 men died of tubercle within a year of leaving. These are facts for one year, of other years we have no information; yet something of the sort no doubt happens. Is it then right for the Government department responsible to try to persuade us that 24 tubercle deaths among 127,518 seamen measures with some accuracy the annual liability of seamen in the merchant service to death from tubercle, when the only relevant statistics they have suggest that the liability in the one year of which they have information is of an order five times as great—24 and 110 is 134? The only possible excuse I can see is that the Board of Trade does not understand what it is doing. And this is no fantastic suggestion.

The Board of Trade annual return of deaths of merchant seamen is a very exceptional production. It—a medical return—is not issued over the signature of any doctor but over that of a layman, generally (in my time, 1921–1931) an assistant secretary of the Board of Trade, there being no specially experienced doctor on the staff to take responsibility for these published statistics. Is it wonderful then that ten years ago the Royal Sanitary Institute petitioned that the preparation of these statistics should be turned over to the Ministry of Health, "the Board of Trade not being specially organised for this duty"? It is not the reasoned judgment of a committee; as they themselves say (Art. 154) not "definitive or final" (in fact provisional), and we know, contrary to all experience, that seafaring is rather a healthy occupation. Of course there are difficulties in preparing death-rates, but as was seen in the Dardanelles during the war, war is rarely made successfully by committees. What the Board of Trade wants is a doctor of experience and education to keep on examining ships and reports of deaths, and tell the Board what they signify. In the merchant service afloat in the year 1929–30, 24 men died of tubercle, in the same year 110 men died of tubercle within a year of leaving the service; together these make 134. There were 127,518 men in the service afloat, that makes rather more than 1 per 1000 dead of tubercle. The total mortality from tubercle in England and Wales in 1930 was, I believe, 0·89 per 1000, yet one gathers the Board of Trade thinks it has no more worlds to conquer in making seafaring healthy for merchant seamen.

Mr. Runciman said the replacement of British seamen by foreign seamen was largely a matter of climate. He omitted to mention space. Lascars need only have 72 cubic feet, British seamen must have 120 cubic feet; each absorbs an extra ton of cargo space. Why do the Transport Regulations require 200 cubic feet for each soldier on passage but the Board of Trade only 120 for seamen (72 for lascars) to live in permanently? Is the army extravagant or the Board of Trade niggardly?

We hear nothing in the discussion of any decision of the shipowners to make use of the report on suitable standard accommodation for seamen suggested by the Shipping Federations committee, reviewed appreciatively by THE LANCET in 1932 (1932, i., 1367): perhaps it will govern the plans of new ships? Who will tell us of an English ship giving men 240 cubic feet in their cabins and 120 cubic feet in their mess place besides, and free coffee all the time? I have seen all that and more in a United States' ship.

I am, Sir, yours faithfully,

W. E. HOME, M.D., B.Sc., D.P.H., &c.,
Dec 21st. Fleet-Surgeon.

PLEURISY AS A PRECURSOR OF PHTHISIS

To the Editor of THE LANCET

SIR,—I read with great interest the annotation with this title in your issue of Dec. 8th. In my experience there is a great difference between dry pleurisy and pleural effusion. In cases of artificial pneumothorax an effusion is common in tuberculous cases but extremely rare in non-tuberculous conditions. In cases of spontaneous pneumothorax the development of

an effusion is rightly regarded as suggesting tuberculosis. Many years ago Osler pointed out that spontaneous pneumothorax occurred in young adults, chiefly men, and that, if no effusion followed, a good recovery could be expected without danger of pulmonary tuberculosis developing later. When effusion does develop in a case of so-called idiopathic pleurisy it is almost invariably found that a sample of the fluid is of a tuberculous nature, and it seems to me most unwise to suggest to students and medical practitioners that such effusions are not of tuberculous origin. The effusion is the result of a tuberculous lesion, and sanatorium or similar treatment is essential to prevent the development of activity in the lung. I suggest that the good results described in your annotation are the direct outcome of sanatorium treatment, and that one should appreciate the fact that active tuberculosis can be prevented by thorough treatment and that neglect often leads to disastrous results. I am, Sir, yours faithfully,

L. S. T. BURRELL.

New Cavendish-street, W., Dec. 18th.

SEVERE GASTRIC AND DUODENAL HÆMORRHAGE

To the Editor of THE LANCET

SIR,—Dr. Tidy tells us that under modern methods many cases of severe gastric and duodenal hæmorrhage die and die quickly. The question is, he remarks, whether or not the methods can be improved. May I submit that it would be interesting and perhaps very useful to invoke the aid of Dr. Macfarlane's snake venom as a hæmostatic in these desperate cases. I would suggest that the stomach should be washed out to remove the clots and the gastric secretion, and that a small quantity of snake venom—say, 1 in 10,000 in ice-cold water—should be introduced through the tube. In this way little gastric juice would be left in the stomach to interfere with the protein element of the venom, although the risk that the venom should lose its potency is probably small, since its rapid action is a distinctive characteristic.

I am, Sir, yours faithfully,

GORDON RANSOME.

Mecklenberg-street, W.C., Dec. 19th.

SERUM PROPHYLAXIS AND PUERPERAL SEPSIS

To the Editor of THE LANCET

SIR,—Dr. Pulvertaft writes: "If I am wrong in thinking that 'early septicæmic deaths' are toxic, there is no valid basis whatever for my suggested prophylaxis." If, as I suppose, he regards these "early septicæmic deaths" as "toxic" because at post mortem there are no signs of extensive pyogenic invasion, he is profoundly wrong, and may well abandon his proposal for a prophylactic method which does not seek to prevent infection. A perusal of our many post-mortem records would show him at once that about 80 per cent. of the deaths are associated with generalised peritonitis (a fact which was brought out by Lea in 1910), or with septic thrombophlebitis of large veins—both very gross evidences of progressive pyogenic infection. The "early septicæmic death" which Dr. Pulvertaft seems to have in mind is a very rare event in puerperal fever.

It may well be that a toxic product of some kind (perhaps produced by the streptococcus, perhaps by damaged tissues?) is ultimately responsible for the *actual death* in all these cases, but I know of no evidence whatever that this hypothetical toxic product is identical with the Dick toxin or the combination of toxins in Dr. Pulvertaft's broth cultures which kills rabbits within a few hours. Let us frankly admit our ignorance on this important matter. The one fact we do know—Dr. Pulvertaft as well as I—is that the most characteristic effect of Dick toxin in the human body—viz., the scarlatiniform rash, is notoriously absent in the great majority of cases of puerperal fever.

Finally, will Dr. Pulvertaft explain one point? Mrs. A dies in three or four days of infection by a hæmolytic streptococcus. According to him she has really died of poisoning by Dick toxin elaborated by the streptococcus in her body. An "irrelevant" mouse injected with the same streptococcus dies in 24 hours. It is not susceptible to Dick toxin. What killed it? I am, Sir, yours faithfully,

LEONARD COLEBROOK.

Queen Charlotte's Maternity Hospital, Hammersmith, W., Dec. 24th.

TRICHLORETHYLENE

To the Editor of THE LANCET

SIR,—My attention has been directed to the following paragraph on page 2 of "Industrial Maladies," by Sir Thomas Legge (Oxford Medical Publications):—

"Again the rapidity of absorption is important, for with some poisonous gases in sufficient amount, it is so quick as to cause instantaneous unconsciousness (carbon monoxide, sulphuretted hydrogen gas, trichlorethylene)."

I have had very considerable experience of the effects of chemicals and the measures of protection. It is well recognised that the effect of carbon monoxide and sulphuretted hydrogen of sufficient quantity is dangerous because of the rapidity of the onset of the symptoms of poisoning and in some cases sudden unconsciousness. In the case of trichlorethylene, however, my experience of the effects of this substance are at variance with the above paragraph. Trichlorethylene is similar to other chlorinated hydrocarbons such as dichlorethylene, perchlorethylene, and chloroform in that it is a narcotic and it is similar to chloroform in that it does not produce sudden unconsciousness. In these circumstances, the classification of trichlorethylene with carbon monoxide and sulphuretted hydrogen appears to me not in accordance with fact.

I am, Sir, yours faithfully,

THOMAS E. A. STOWELL, M.D., F.R.C.S.,
Chief Medical Officer.

Imperial Chemical House, Millbank, Westminster, Dec. 17th.

MATERNAL MORTALITY

To the Editor of THE LANCET

SIR,—In reply to a deputation from the Maternal Mortality Committee, as you noted in your last issue (p. 1419), Sir Hilton Young indicated five directions in which he considered an improvement most desired. That is to say, five directions improvement in which would lead to a reduction in maternal mortality. The first of the Minister's recommendations is for an improved antenatal service. The last four which cover the provision of more trained midwives, more beds, and the service of consultants, may be summed up as meaning a maternity service scheme for the country. Such a service, however, could do little towards reducing mortality unless one vital factor is given the most complete recognition. That one factor is skilled treatment at the time of the actual confinement. The provision of nurses, beds, and consultants can be

of little avail after the damage has been done by unskilled practical obstetrics.

Much discussion, both verbal and written has taken place during recent months concerning the first recommendation—antenatal care—and maternal mortality. In the wealth of opinion and information put forward the correct relationship between these two very distinct entities is in great danger of being distorted or even entirely lost. The two are discussed as being interdependent to a degree of almost mathematical proportions. Such is far from being the case, and if this mistake is made no amount of effort will produce any appreciable reduction in our mortality figures. If the discussion, money, and thought which have been devoted to antenatal care in its relation to mortality during the last few years had been expended upon intranatal care we should be able now to claim that definte progress had been made. No one will deny the benefits that result in efficient antenatal care, but however efficient however skilled it may be, it cannot to any great extent reduce the maternal mortality of this country. Its abolition would of course tend to a definite increase, but the reverse does not hold good. That is perhaps a somewhat provoking statement which demands justification.

If we look at the figures given by the Departmental Committee as a result of its recent investigation, it will be seen that between 60 and 70 per cent. of the maternal deaths are the result of actual childbirth and not of conditions complicating pregnancy. If to these are added the deaths from abortion (a miniature childbirth) our figures would be 70 to 80 per cent. Now the causes of death: sepsis 40 per cent. (in primiparous patients over 50 per cent.), hæmorrhage 19 per cent., operative shock 10 per cent., and abortion, if included, 13 per cent. I have given these percentages to the nearest round figure, ignoring the fractions. It is quite impossible to maintain that antenatal care can to any appreciable degree control these causative factors. It may, in fact does, assist by very general means in lessening the likelihood of these complications of childbirth. It cannot, however, prevent sepsis, operative shock or deaths from hæmorrhage. It may prevent abortion, but an abortion is no cause of death without some of the other factors added. Even so, I am not suggesting that antenatal care is of no value. It has, however, received more than its fair share of attention to the exclusion of the far more important question of intranatal care.

If we take the remaining deaths amounting to between 20 and 30 per cent. we find the causative factors are toxæmias 16 to 19 per cent., embolism 6 to 7 per cent., extra-uterine 1 to 2 per cent. It is obvious that here is the main field of use for antenatal care, particularly in those areas in which the incidence of such causes as toxæmia is above the average. These conditions are responsible for about 30 per cent. of the maternal deaths. If to this is added a further 10 per cent. of deaths which might be prevented by such means as the avoidance of the necessity for emergency measures by the timely diagnosis of abnormalities, we have 40 per cent. of the maternal deaths as being controllable to some degree, however small, by antenatal care. This is perhaps exaggerating if anything the usefulness of antenatal care, but it is sufficiently accurate to support the cause for its necessity. Its abolition could cause a rise in maternal mortality of anything up to 40 per cent. But no amount of antenatal treatment will reduce the mortality to zero, nor even half its present percentage. Until, and unless, our knowledge is considerably advanced it can never avoid the occurrence of some of the most serious complications of childbirth. It cannot prevent a placenta prævia, nor the introduction of sepsis through unskilled treatment of this condition; it cannot prevent the tragedy of the failed forceps with a half-dilated os, nor many other obstetrical tragedies which quickly come to mind.

How then can the maternal mortality of this country be reduced? The answer lies in better treatment at the time of delivery, and it is from this point of view that the problem must be tackled. Herein lies, too, the answer to Mr. Baldwin's message, quoted in your leading article of Nov. 17th, exhorting the British College of Obstetricians regarding "some factor which may have hitherto eluded our vigilance." I do not of course suggest that this factor has eluded the vigilance of the authorities, but it has certainly not been given the pride of place to which it belongs. We have seen that at the lowest estimate 60-70 per cent. of the deaths occur after and as a result of the actual delivery. These deaths have been investigated and the causes ascertained. I would suggest that a further investigation be undertaken to discover what kind of practice contributes the majority of these cases.

It is, I believe, a fact that the mortality-rate in patients looked after entirely by widwives is considerably below the average for the country. The same is true also for cases attended antenatally and in confinement at maternity hospitals and maternity departments of general hospitals. This leaves us with the practice of the obstetric specialist and with that of less-skilled practitioners. In this connexion, by obstetric specialist I do not imply only the so-called consulting obstetrician and gynæcologist, but anyone who, by training, experience, and real desire to do this type of work, is qualified to be called an obstetric specialist. Now if it were possible to analyse the maternal deaths in this way, I am convinced that the large majority would be found in the practices of those without experience or time to do the work properly; those who from sheer necessity and force of circumstance have to go from childbirth to septic case and back again to childbirth often in surroundings which would daunt the most courageous if confronted with anything more serious than a spontaneous delivery; whose patients, generally undernourished and overworked, are in the worst possible condition to withstand the demands of normal childbirth, much less the strain of necessary or unnecessary interference.

If this suggestion is correct—and there can be little doubt—the answer to the question "How can maternal mortality be reduced?" lies in improvement beyond all measure in the standard of treatment given to the woman in labour; not instead of but in addition to the efforts that have been made in the direction of antenatal care. But reverse the present system. It is the specialist who should be looking after the actual confinement and the practitioner doing the antenatal care. Such provision would certainly have to be the basis of any successful maternity service scheme, until such time as there were sufficient obstetricians to undertake the entire work. Put the state of childbirth on a higher plane: let it be recognised as potentially a major surgical procedure—as indeed it is. If other major surgical procedures were dealt with in surroundings such as hold good for childbirth the resulting mortality would never be tolerated.

This argument might be countered by asking "But how do you reconcile this with the fact the midwives have such a low mortality?" The answer

is because they are not allowed to do anything. More than half the preventable deaths in childbirth are caused by unskilled and unnecessary interference. More than half the deaths in childbirth are preventable. If nothing more than vaginal examination were ever carried out by anyone not qualified by training, experience, and leaning to be called an obstetric specialist, we should halve the maternal mortality of this country. If no one but an obstetric specialist in its true sense ever dealt with pregnancy or parturition, the mortality would be still further reduced.

This may seem a mere visionary ideal; but is it? Once the principle is accepted that childbirth is a sufficiently serious problem to warrant specialised treatment, the rest would follow. A maternity service scheme for the country would surely eventuate. As was pointed out in your leading article, arrangements were made in 1931 for a grant to assist such a scheme; there are those now ready and willing to formulate and work out a practical proposition. Surely now is the time and in due course an adequate supply of real obstetricians would arise together with the necessary facilities to ensure that every woman in the country received satisfactory attention.

I am, Sir, yours faithfully,

F. NEON REYNOLDS.

Devonshire-place, W., Dec. 19th.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Comdr. A. B. Clark, M.B. to *President* for R.N. College, Greenwich.

Surg. Lt.-Comdr. W. A. Hopkins, M.B., to *Victory* for R.N. Hospital, Haslar.

Surg.-Lts. J. M. McNamara and M. J. Brosnan are promoted to rank of Surg. Lt.-Comdr.

Surg. Lts. A. E. Flannery to *Harebell* and W. Greaves, M.B., to *Victory* for Haslar Hospital.

Surg. Lt. (Short Service) W. A. R. Thomson, M.D., resigns.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. T. G. Evans promoted to Surg. Lt.-Comdr.

ROYAL ARMY MEDICAL CORPS

Brevet-Col. H. Marrian Perry, O.B.E., hon. surgeon to the King, to be Col. and director and professor of pathology at the Royal Army Medical College, Millbank, in succession to Col. A. C. H. Gray, O.B.E., hon. surgeon to the King, who retires after 31 years' service in the Army.

Capt. P. N. Creagh to be Maj. (temporary commission).

REGULAR ARMY RESERVE OF OFFICERS

Lt.-Col. O. C. P. Cooke retires from the Res. of Off.

TERRITORIAL ARMY

Lt. W. Patrick to be Capt.

Supernumerary for service with O.T.C.—Norman John Logie (late Cadet, Glasgow High Sch. Contgt., Jun. Div., O.T.C.) to be Lt. for duty with Med. Unit, Aberdeen Univ. Contgt., Sen. Div., O.T.C.

ROYAL AIR FORCE

Squadron Leader H. McW. Daniel to Royal Air Force Depôt, Uxbridge, for duty as medical officer.

Squadron Leader Lewis Patrick McCullagh, M.B., retires.

Flight Lts. F. W. P. Dixon, M.B.E., to No. 101 (B) Squadron, Bicester; and J. S. Carslaw to No. 5 (Army Coöperation) Squadron, Quetta, India.

Flying Offrs. J. C. Blair to No. 2 Flying Training School, Digby; H. F. Harvey to No. 3 Flying Training School, Grantham; and G. H. Morley to No. 5 Flying Training School, Sealand.

Dental Branch.—Flight Lt. Ernest Sharp, L.D.S., is transferred to the Reserve, Class D.

MEDICAL NEWS

University of Oxford

At recent examinations for the degrees of B.M., B.Ch., the following candidates were successful in the undermentioned subjects:—

Pathology.—D. L. Davies, H. N. Davis, A. W. Dawson-Grove, W. W. Gifford, J. R. Hollick, M. H. Hughes, D. Kendall, J. F. Loutit, N. J. de V. Mather, R. W. Parnell, A. H. M. Richards, R. Roaf, K. C. Royes, N. K. Stott, and J. Walter.

Medicine, Surgery, and Midwifery.—H. A. Brodribb, Roy Clark, A. Fearnley, P. R. Greeves, C. A. Hinds Howell, A. H. Hunt, T. G. Lowden, R. McDonald, R. Passmore, N. K. Stott, and T. M. Williams.

University of Cambridge

On Dec. 19th the following degrees were conferred:—

M.D.—J. St C. Elkington, J. H. L. Easton, David Aserman, E. A. Nicoll, and L. E. Houghton.

M.B., B.Chir.—A. C. de B. Helme, Arthur Lister, Arthur Willcox, C. S. Hall-Smith, C. H. D. Bartley, F. J. Curtis, R. S. Handley, and A. M. Lester.

M.B.—R. H. Dobbs (by proxy), W. A. Elliott, C. P. F. Boulden, A. R. R. Mears, and F. W. Holdsworth.

B.Chir.—R. W. D. Turner and F. B. Turner.

Royal College of Surgeons of England

At a meeting of the council on Dec. 13th licences in dental surgery were granted to the following candidates:—

A. G. T. Allcorn, C. M. Beales, E. G. W. Bowerman, E. N. Brown, G. C. Burton, T. E. Carr, F. R. Chamberlain, H. E. Clark, H. C. Davis, A. J. W. Day, R. M. De Lloyd, R. H. Dix, I. Ll. Edmunds, C. B. G. Elstob, A. E. Everett, A. F. Ferguson, A. I. Fidian, D. H. Fielder, K. E. J. Fletcher, H. C. French, Gertrude Hamburger, C. L. R. Harris, H. G. Harris, R. J. G. Hayton-Williams, R. L. V. Henderson, A. M. Horsnell, H. V. E. Jessop, G. M. Johnson, W. A. Jones, A. A. Joubert, W. C. Kendrick, S. A. Leader, J. H. G. Morris, H. M. A. Ovington, G. J. Parfitt, J. D. T. Pickering, S. H. Pollard, J. S. P. Poole, C. A. Reynolds, K. L. Scott, A. G. Smith, J. W. E. Snawdon, P. G. Sparg, K. G. Swiss, H. C. A. Weighell, I. C. L. Wren, W. N. Wycherley, and S. M. Young.

The following hospitals were approved, with the posts specified, for recognition for the six months' surgical practice required of candidates for the final fellowship examination:—

London.—Dreadnought Hospital, Greenwich (2 house surgeons); Hampstead General and North-West London (2 house surgeons); Prince of Wales Hospital, Tottenham (2 senior house surgeons); and Royal Northern Hospital, Holloway (1 resident medical officer and 3 house surgeons).

Provinces.—Royal United Hospital, Bath (first and second house surgeons); Blackburn and East Lancashire Royal Infirmary (1 resident surgical officer and 2 house surgeons); Royal Victoria and West Hants Hospital, Bournemouth (3 house surgeons); Royal Infirmary, Bolton, (1 resident surgical officer and 1 assistant resident surgical officer); Royal Devon and Exeter Hospital (2 house surgeons); Gloucestershire Royal Infirmary and Eye Institution (1 resident surgical officer and 2 house surgeons); Huddersfield Royal Infirmary (1 resident surgical officer and 3 house surgeons); Hull Royal Infirmary (1 resident surgical officer and 3 house surgeons); Leicester Royal Infirmary (4 house surgeons); Norfolk and Norwich Hospital (3 house surgeons); General Hospital, Nottingham (4 house surgeons); South Devon and East Cornwall Hospital, Plymouth (1 resident surgical officer and 2 house surgeons); Royal Portsmouth Hospital (1 resident surgical officer and 2 house surgeons); Preston and County of Lancaster Queen Victoria Royal Infirmary (3 house surgeons); Royal Berkshire Hospital Reading (2 house surgeons); Salford Royal Hospital (1 resident surgical officer and 3 house surgeons); and Worcester Royal Infirmary (2 house surgeons).

Royal College of Surgeons of Edinburgh

At a meeting of the College held on Dec. 18th, with Dr. A. H. H. Sinclair, president, in the chair, the following candidates having passed the requisite examinations were admitted to the fellowship:—

Charles Daniel Galbraith Williams, M.D. Toronto; Thomas John Eason, M.B. Edin.; George Connell Ferguson, M.D. Q.U. Ontario; Bernard Bruce Freshwater, M.B. Edin.; Michael Gaffney, M.B. Edin.; Charles John Kenneth Hamilton, M.B. Camb.; James Alexander Imrie, M.B. Glasg.; James Grant Irving, M.D. Toronto; John Molineux Jackson, M.R.C.S. Eng.; Owen Vaughan Jones, M.B. Liverp.; Ian Douglas Kitchin, M.B. Aberd.; Alexander Daniel Konkin, M.D. Manitoba; John Lowe, M.D. Edin.; Charles Cowan McCallum, M.B. Glasg.; Mellis MacCulloch, M.B. Edin.; Carlos Agapito

Pascual d'Assumpcao Martins, M.B. Bombay; Philip Haig Merlin, M.B. Birm.; David Carmichael Monro, M.B. Edin.; William Ian Clinch Morris, M.B. Edin.; Isaac Newton, M.R.C.S. Eng.; Ernest Alexander Nicoll, M.R.C.S. Eng.; Hugh Llewellyn Rees, M.R.C.S. Eng.; Naomi Reuben, M.B. Punjab; David Nathan Rocyn Jones, M.R.C.S. Eng.; Ian Marshall Rutherford, M.B. N.Z.; Richard Gabriel Akiwande Savage, M.B. Edin.; Peter Shannon, M.D. Glasg.; Ponnusamy Ramakrishna Thiagarajah, L.R.C.P. Edin.; William Edward Thompson, M.B. Edin.; and John Harper Wilson, M.B. Edin.

National University of Ireland

At recent examinations in University College, Cork, the following candidates were successful:—

M.D.

J. J. Healy.

M.B., B.CH., B.A.O.

D. J. Burgess, J. J. Glynn, M. D. Hegarty, J. J. Hurley, J. F. MacCarthy, T. J. Mullins, T. P. O'Brien, T. P. O'Connor, D. G. O'Driscoll, Patrick Powell, and Thomas Sutton.

Part I.—J. P. Corcoran, Mary P. Quinlan, and J. N. McCarthy.
Part II.—D. C. Lawton.

University of Manchester

At a special meeting of the court of governors held on Dec. 20th Mr. J. S. B. Stopford, M.D., F.R.S., professor of anatomy in the university, was appointed as vice-chancellor until permanent arrangements are made.

At recent examinations the following were successful:—

FINAL EXAMINATION FOR M.B., CH.B.

Part I.—Jack Cohen, A. J. F. Crossley, H. A. Korotz, Bernard Thornley, and G. W. Ward.
Part II.—John Boardman, John Curry, E. G. Dryburgh, Arthur Harris, B. P. Hill, J. A. Hobson, R. H. Jobson, S. H. O. Jones, Freda H. Knight, Winifred Porter, W. K. Spencer, Marjorie Swain, and A. Mc. N. Tomlinson.

University of Sheffield

At recent examinations the following candidates were successful:—

FINAL EXAMINATION FOR M.B., CH.B.

Part I.—Charles Axinn (with distinction in forensic medicine), L. A. Bull, William Ellis, J. C. Jolly, and Ronald Scott.
Part II.—J. S. Hollingworth, H. J. Lee, and Evelyn W. C. D. Pettigrew.

Appointments

DAINTY, R. G., M.R.C.S. Eng., has been appointed Hon. Dental Anæsthetist to the National Temperance Hospital.
DUNLOP, H. A., M.D., M.Sc., M.R.C.P. Lond., Hon. Assistant Physician to Charing Cross Hospital.
EVANS, COURTENAY, M.D., M.R.C.P. Lond., Physician to the Eastern Dispensary, Leman-street, E.
EVANS, M. D. ARWYN, M.D. Wales, F.R.C.S. Edin., M.C.O.G., Hon. Assistant Gynæcologist to the Cardiff Royal Infirmary.
HUDSON, E. H., M.B., M.R.C.P. Lond., Physician to the Eastern Dispensary, Leman-street, E.
KEMBLE, JAMES, M.B. Sydney, F.R.C.S. Eng., Hon. Surgeon to the London Lock Hospital and Home.
KIRK, R. S., M.B. Edin., Hon. Anæsthetist of the Hospital for Sick Children, Great Ormond-street.
LYSAGHT, A. C., F.R.C.S. Eng., Hon. Assistant Surgeon to the Cardiff Royal Infirmary.
MACVICAR, W., M.D. Manitoba, F.R.C.S. Edin., Resident Medical Officer to the Royal Infirmary, Sunderland.
MCWHIRTER, ROBERT, M.B. Glasg., F.R.C.S. Edin., D.M.R.E., Assistant Radiologist to the Miller General Hospital.
OGILVIE, W. H., F.R.C.S. Eng., Additional Surgeon to the Royal Masonic Hospital.
PREISKEL, I., M.B. Lond., F.R.C.S. Eng., Hon. Surgical Registrar to All Saints' Hospital, London, S.E.
SEMPLE, J. E., M.D. Camb., F.R.C.S. Eng., Resident Assistant Surgeon.
SMALL, H. A., M.B. N.Z., Resident Medical Officer to Queen Mary's Hospital for the East End, Stratford, E.
WHITE, J. A., M.B. Lond., F.R.C.S. Eng., Second Assistant in the Surgical Unit of St. Mary's Hospital Medical School.

Royal Free Hospital.—The following appointments are announced:—
SHELLEY, URSULA, M.D., M.R.C.P. Lond., Medical Registrar;
BECK, D. J. KINLOCH, M.B. Lond., F.R.C.S. Eng., Surgical Registrar; and
WHITE, M. M., M.B. Lond., F.R.C.S. Eng., Gynæcological Registrar.

Vacancies

For further information refer to the advertisement columns

Bath, Royal United Hospital.—Hon. Physician.
Birmingham, Cantrell Hall Babies' Hospital.—Res. M.O. At rate of £250.
Bolingbroke Hospital, Wandsworth Common, S.W.—Hon. Physician for Diseases of Children.
Bristol Eye Hospital.—Asst. Res. H.S. £100.
Bristol Royal Infirmary.—H.P.'s and H.S.'s. Each at rate of £80. Also Cas. H.S. At rate of £100.
Burton-on-Trent General Infirmary.—Cas. O. and H.P. £150.
Elizabeth Garrett Anderson Hospital, Euston-road, N.W.—Hon. Appts. Also Asst. Radiologist. £100.
Exeter, Devon Mental Hosp., Exminster.—Jun. Asst. M.O. £350.
Exeter, Royal Devon and Exeter Hospital.—H.P. At rate of £150.
Folkestone, Royal Victoria Hospital.—Sen. and Jun. Res. M.O.'s. At rate of £150 and £120 respectively.
Great Yarmouth General Hospital.—H.S. £140.
Hospital for Consumption and Diseases of Chest, Brompton, S.W.—H.P. £50.
Hospital for Sick Children, Great Ormond-street, W.C.—Out-Patient Med. Reg. £250. Also Surg. Reg. £200.
Hull Royal Infirmary.—First H.P. At rate of £175.
India.—Six Gazetted Appts. for Med. Res. Dept. Each Rs.625–Rs.1350 calendar month.
Infants Hospital, Vincent-square, Westminster.—Asst. Phys.
Lincoln County Hospital.—H.S. At rate of £150.
Liverpool, Alder Hey Children's Hospital.—Res. Asst. M.O. £200.
Liverpool School of Tropical Medicine.—Caton Memorial Research Fellowship. £400.
Liverpool, Women's Hospital, Catharine-street.—Hon. Asst. Surgeon.
L.C.C. Hospital, Ducane-road, Hammersmith.—Three H.P.'s. Also Two H.S.'s.
Manchester, Ancoats Hospital.—Res. Surg. O. £200.
Manchester Hospital for Consumption and Diseases of the Throat and Chest.—Res. M.O. for Throat Dept. £200.
Manchester, Monsall Hospital for Infectious Diseases.—Deputy Med. Supt. £600.
Mansfield, Harlow Wood Orthopædic Hospital.—Two H.S.'s. Each at rate of £200.
Nottingham General Hospital.—H.S. At rate of £150.
Putney Hospital, Lower Common, S.W.—Gynæcological Surgeon.
Scunthorpe and District War Memorial Hospital.—Res. Surgeon. £250.
Sheffield, Lodge Moor Infectious Diseases Hospital.—Jun. Asst. M.O. £200.
Sheffield Royal Hospital.—Surg. Registrar.
Sheffield Royal Infirmary.—Ophth. H.S. Asst. Cas. O. and Asst. Aural and Ophth. H.S. Each at rate of £80.
Staffordshire General Infirmary.—H.S. At rate of £200.
Surrey County Council.—Asst. M.O. £600.
Tunbridge Wells, Kent and Sussex Hospital.—Second H.S. Also Third H.S. £150 and £125 respectively.
West London Hospital, Hammersmith-road, W.—Hon. Asst. Radiol.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Tisbury, Wilts; Saddleworth, Yorks; Winchester, Hants; and Greenodd, Lancs.

Medical Referees under the Workmen's Compensation Act, 1925, for the City of London County Court District and the Bridgnorth, Craven Arms, Llanfyllin, Ludlow, Madeley, Oswestry, Shrewsbury, Wellington, Welshpool, and Whitchurch County Court Districts (Circuit No. 28). Applications should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W. 1, before Jan. 4th and 12th, 1935, respectively.

Births, Marriages, and Deaths

BIRTHS

PUDDY.—On Dec. 16th, the wife of Eric Puddy, M.B. Lond., of Litcham, King's Lynn, Norfolk, of twin daughters.

MARRIAGES

WARDEN BROWN—WAY.—On Dec. 13th, at Caxton Hall, Westminster, Felix Warden Brown, B.M. Oxon., only son of C. Warden Brown, of Bedford, to Eileen Way, only daughter of George Way, of the Adelphi, London.
WICKHAM—VACHER.—On Dec. 17th, at Portsmouth, Surgeon-Commander F. St. B. Wickham, O.B.E., R.N., to Dorothy Violet Vacher.
WOLFE—GEDDES.—On Dec. 20th, Eric Dudley Birch Wolfe, M.B. St. And., Malayan Medical Service, elder son of the late Henry Wolfe and of Mrs. Wolfe, Braintrees, Harpenden, to Mabel Alice, youngest daughter of the late John Geddes, Nahor Habi, Assam, and of Mrs. Geddes, Aberdeen.

DEATHS

DEAN.—On Dec. 16th, suddenly, at Florida, Gordon Moncrieff Dean, M.B. Aberd., only son of the late Prof. George Dean and of Mrs. Dean, 22, Rubislaw Den North, Aberdeen, aged 34.
FRASER.—On Dec. 20th, at Cambridge-road, Felixstowe, Ernest A. Fraser, M.R.C.S. Eng., aged 71.
HARSTON.—On Dec. 21st, at a nursing-home, Putney, George Montagu Harston, M.D. Lond., D.O. Oxon., of Colinette-road, Putney, aged 64.
LEEMING.—On Dec. 19th, at Highgate, Kendal, R. W. Leeming, M.D. Camb., for 43 years Medical Officer for the Kendal Union.
RENNIE.—On Dec. 16th at a nursing-home in Norwich, Lieut.-Col. Patrick Manson Rennie, M.B. Aberd., late I.M.S., of Diss, Norfolk, son of the late T. Rennie, M.D., of Foochow, China.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

THE CHEMISTRY OF CANCER*

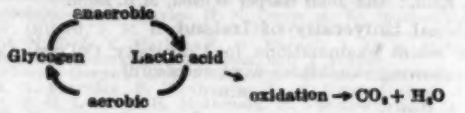
BY ELLICE MCDONALD, M.D.

DIRECTOR OF CANCER RESEARCH, GRADUATE SCHOOL OF MEDICINE, UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA, PA.

IF there is any hope of a cure of cancer it lies in knowledge of the chemical metabolism of normal and cancer cells. It is established that the metabolic processes of the cancer cell differ in certain fundamental ways from those of various normal cells. The clearer understanding of these differences and the ultimate regulation of the irregular processes by specific chemical reagents is the objective of research to-day.

The accepted methods of the treatment of cancer, by surgery and radiation, cure only a small proportion of all cases, probably about 10 per cent., and have almost exhausted their possibilities; so that their further refinement will do little to increase the percentage of cures. In fact, the rise in cancer mortality in the last three years has more than counterbalanced any improvements in these two forms of treatment. Surgery and radiation, being local measures, have only a limited scope, whereas the large majority of cancer patients have the disease in a generalised or systemic form, which makes local measures ineffectual. It is for this reason that the chemical point of attack offers so much interest. The only significant differences between normal cells and cancer cells are the differences in their chemical metabolism; for almost all pathologists freely state that there are no microscopic criteria to distinguish an individual cancer cell from a normal one, and the pathological diagnosis depends upon the general cellular picture or geographical arrangement as seen in dead stained sections. Where pathological study is only qualitative the chemical study of cancer is on an exact mathematical basis; for it can recognise and record constant chemical differences in a quantitative manner. The most significant of these differences are those observed on investigation by the Warburg method or its modifications, and they are found to be constant and reproducible.

The fundamental discoveries of Warburg† have shown that the chief differences between cancer and normal cells relate to carbohydrate breakdown. Normal cells obtain their energy from the breakdown of carbohydrate into lactic acid and the subsequent oxidation of lactic acid into carbon dioxide and water. Carbohydrate is broken down under anaerobic conditions (anoxidative) through various intermediate steps into lactic acid with liberation of energy. Under aerobic conditions (oxidative or oxygen consumption) a portion of the lactic acid, or its carbohydrate equivalent, is oxidised to carbon dioxide and water with the further liberation of energy. This energy then reconverts the remainder of the lactic acid into carbohydrate and the process is repeated.‡ This process is present, as a source of energy, in all normal carbohydrate-utilising cells, so that lactic acid does not accumulate in any amount. The process is shown in the well-known Meyerhof cycle of carbohydrate breakdown in muscle.



It should be noted here that certain terms have become established in this study, and that these have acquired certain meanings. The anaerobic phase of metabolism which is concerned with the breakdown of carbohydrate into lactic acid is anoxidative in character and is called fermentation or glycolysis; the aerobic phase—concerned with oxygen consumption, oxidative—is called respiration. These terms grew up from the work of Pasteur on yeast and have maintained themselves ever since. It is interesting to see that this great genius, having directed medical research for 60 years towards bacterial infections, the invading enemy, seems now to have initiated a new phase of medical search, in the chemical study of cellular metabolism. In the cancer cell there is a definite defect in the oxidative carbohydrate metabolism. (It should be noted that the term "carbohydrate metabolism" applies to chemical processes of carbohydrate (glycogen) breakdown by cellular activities. The medical meaning of carbohydrate metabolism as the amount and processes of blood-sugar is another thing.) Under anaerobic conditions cancer cells split carbohydrate to lactic acid at a very high rate; but there appears to be a defect in the respiration (oxidation), so that under aerobic conditions oxidation of a part of the lactic acid, or its carbohydrate equivalent, and resynthesis of the remainder to glycogen (or inhibition of lactic acid formation) does not occur to any large extent. Therefore lactic acid accumulates. In other words, respiration does not prevent the accumulation of lactic acid, and the cancer cell glycolyses very rapidly even under aerobic conditions. Normal cells, on the other hand, usually but not always have a rather low glycolysis under anaerobic conditions, and a high respiration under aerobic conditions. Moreover under aerobic conditions the respiration is effective in preventing the accumulation of lactic acid. In other words, normal cells do not glycolyse to any extent under aerobic conditions. Table I., from Dickens,[1] shows very well the defective oxidation of the cancer cell.

TABLE I.—*The Oxidative Defect in Cancer (Dickens)*

—	Tissue.	Anaerobic glycolysis $Q_A^{CO_2}$*	Respiratory quotient.
Normal Tissue—			
Low R.Q. Low glycolysis	Liver	3	0·79
	Kidney	3	0·85
	Intestinal mucosa	4	0·85
	Spleen	8	0·89
High R.Q. High glycolysis	Embryo-chick	18	1·00
	Brain cortex	19	0·99
	Chorion	32	1·02
Cancer—			
Low R.Q. High glycolysis	Jensen sarcoma	34	0·82
	Tar carcinoma	22	0·87
	Sarcoma 37 S	27	0·86

* $Q_A^{CO_2}$ = the number of mm.³ of CO_2 liberated anaerobically by the acid produced in 1 hour per mg. of dried tissue.

* An address before the Pittsburgh and Niagara sections of the American Chemical Society.

† The original work of Warburg is collected in his book, Ueber den Stoffwechsel der Tumoren (Berlin, 1926). An excellent English translation by Dickens, who himself has added considerably to the study of cancer, is the Metabolism of Tumours, edited by Otto Warburg, translated from the German, with accounts of additional researches, by Frank Dickens (London, 1930).

‡ Besides stimulating resynthesis of the lactic acid to glycogen the aerobic conditions also probably have a direct effect in inhibiting to some extent the formation of lactic acid from glycogen. The net result is the same—no lactic acid accumulation.

In normal tissue the glycolysis seems to run parallel to the respiratory quotient (the ratio of $\frac{CO_2 \text{ formed}}{O_2 \text{ consumed}}$) and indicates the effectiveness of the respiration. Thus we have normal tissues with low glycolysis and low respiratory quotient or normal tissues with high glycolysis and high respiratory quotient. In cancer, however, we find high glycolysis and low respiratory quotient, which indicates that the carbohydrate oxidative mechanism is defective. It is with the nature of this oxidative defect and its relation to the high glycolytic power of the cancer cell that our research in cancer is concerned.

Some of the main differences found between cancer and normal carbohydrate metabolism may be enumerated :—

1. Cancer tissue shows a high anaerobic glycolysis as compared with most normal adult tissues.
2. Cancer tissue possesses a defective respiration, as indicated by its high aerobic glycolysis. Normal tissues do not glycolyse appreciably under aerobic conditions.
3. Cancer tissue does not utilise hexose phosphates (Robison, Harden-Young esters) added to the suspending medium, whereas most types of normal tissue do.
4. Cancer tissue does not utilise glycogen added to the suspending medium, whereas most types of normal tissue do. Cancer tissue, on the other hand, metabolises glucose very rapidly, whereas muscle and other tissues do not, unless an activator (hexokinase) is added.
5. Lactic acid increases the respiratory quotient of normal tissues with low R.Q. above the value obtained with carbohydrate, while it has no effect on the respiratory quotient of cancer tissue. This indicates that lactic acid oxidation is defective in cancer. Pyruvic acid, on the other hand, increases the respiratory quotient of both cancer and normal tissue to a value approaching the theoretical.[1,2] This indicates that pyruvic acid, which is one of the intermediates in carbohydrate breakdown, is normally metabolised by cancer cells.
6. The blood-sugar level of cancer patients is in general higher than normal, and their glucose tolerance is in general deficient. There is still some argument about the last statement, but a mass of evidence is accumulating in favour of it.

It should be emphasised that these differences are not a matter of opinion but are demonstrable by exact chemical methods which are consistent and reproducible. They can be proved. They can be observed by means of thin slices of tumour tissue and manometric experiments, and a very interesting example here is the experiments of K. A. C. Elliott, in our laboratories, using a manometer set-up of the Dixon-Keilin type and a transplantable rat sarcoma which

TABLE II

—	QO_2	QCO_2	R.Q.	Q^O_Δ	Q^N_Δ
Rat sarcoma, Phila. No. 1—					
With glucose	7·7	6·2	0·81	12·0	26·0
Without glucose ..	11·2	8·3	0·74	−0·9	1·0
Normal spleen (rat) ..	13·0	—	—	0	9·0
Normal lung (rat embryo)	16·0	—	—	0	14·0

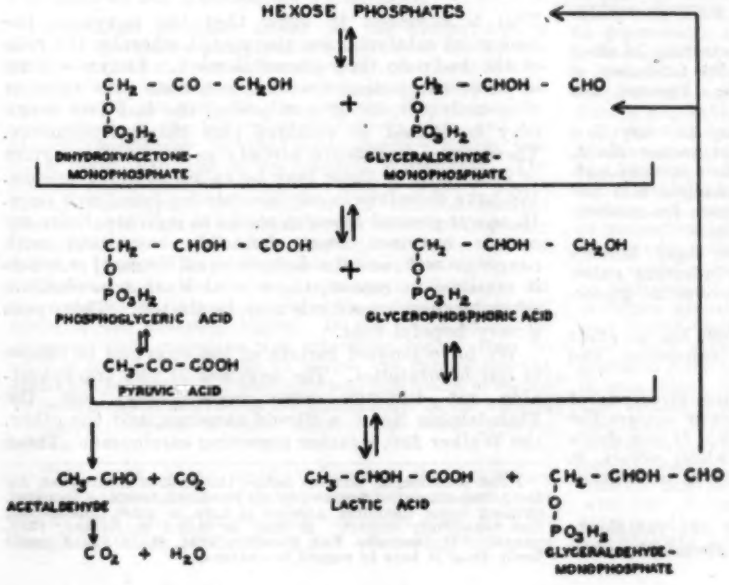
QO_2 = the number of mm.³ of O_2 taken up in one hour per mg. of dried tissue.
QCO_2 = the number of mm.³ of CO_2 given out in one hour per mg. of dried tissue.
R.Q. = the ratio of CO_2 output to O_2 uptake.
Q^O_Δ = the number of mm.³ of CO_2 liberated aerobically by the acid produced in one hour per mg. of dried tissue.
Q^N_Δ = the same in the absence of oxygen.

we call the Philadelphia No. 1, because it was accidentally discovered in the laboratories.

This tumour is a rapidly growing rat sarcoma, marked by many mitoses and a large proportion of successful takes in transplantation. It produces metastases and advances to cause death of the animal. Pathologically it is a consistent transplantable rat sarcoma which has little necrosis. This tumour had been transplanted in our laboratories through hundreds of animals over a period of more than a year. Its pathological description may be found in a study of enzymes in cancer by Waldschmidt-Leitz, McDonald, et al.[3] Elliott's experiments were done with thin slices of this tumour, and the results were consistent with other cancer metabolism studies and are shown in Table II. For comparison, data obtained on two normal tissues are included. It is seen that the new transplantable sarcoma has the cancer type of metabolism. The anaerobic glycolysis (26·0), although cut down aerobically (12·0), is still high. In the absence of glucose the anaerobic glycolysis is negligible and, aerobically, it is actually a small negative quantity, presumably due to traces of preformed lactic acid. The normal tissues show no aerobic glycolysis.

The high aerobic glycolysis of cancer tissue in the presence of glucose is distinctive and is the most peculiar feature of cancer metabolism. Cancer tissue has the power of utilising glucose very rapidly, whereas muscle and other normal tissue does not unless an activator is present. Cancer tissue does not utilise glycogen when suspended in this substrate, whereas normal tissue does. Here then is a reaction characteristic of cancer in its chemical metabolism and this type of metabolism is the rule in cancer. The above experiments were made upon thin slices of fresh tumours and, as a proof that these cells were still living, Miss Russell, of our laboratories, transplanted into rats some of these slices from the Ringer's solution in which they were kept, and the usual type of sarcoma grew from these transplants. The slices were viable and could be used as grafts to produce tumours.

TABLE III.—*Carbohydrate Breakdown (Embden-Meyerhof)*



This experiment may be taken as a type and example of one phase of chemical study in cancer, and many variants may be added in this type of work. It gives the opportunity of studying the chemical processes of living tissue in glass apparatus and of arriving at experimental results which would not be possible by animal experimentation or pathological observation alone.

To properly understand what changes take place in the destruction of glycogen to lactic acid under normal conditions the Embden-Meyerhof scheme of carbohydrate breakdown should be studied (Table III.). This is a representation of the processes whereby the carbohydrate (sugar-glycogen) goes through the various steps on its way to lactic acid. The hexose phosphate first formed from glycogen or glucose splits into two molecules of triose phosphates. These two triose phosphates undergo an intramolecular oxidation-reduction to give the two acids, phosphoglyceric acid and glycerophosphoric acid. The first of these, the phosphoglyceric acid, is converted into pyruvic acid by an enzyme reaction. Pyruvic acid then reacts and is reduced by the glycerophosphoric acid to lactic acid. The glycerophosphoric acid is oxidised to glyceraldehyde phosphate, which may then pass through the whole process again. The conversion of pyruvic acid to acetaldehyde, and the oxidation of this to CO_2 and H_2O represents a possible mechanism whereby carbohydrate is oxidised. These processes are not yet fully understood.

These reactions are delineated diagrammatically, but it must be remembered that enzymes are associated with all the processes and are the means whereby the reactions occur. The regular flow of these metabolic reactions may be altered and changed in certain known ways; in other words, it is possible to influence the carbohydrate metabolism of cells by means of specific chemical substances and in particular ways. It is to be hoped that, when the carbohydrate mechanism is better understood, it will be possible to alter the metabolism of the cancer cell toward normal.

The following are some examples of specific chemical reagents which can alter the course of the cellular metabolic processes:—

1. Iodoacetic acid ($I\text{-}CH_2\text{-}COOH$) inhibits glycolysis, exerting its effect at one and *only one stage* in the mechanism—namely, the reduction of pyruvic acid to lactic acid by glycerophosphoric acid.

2. Sodium fluoride inhibits glycolysis, exerting its effect at an entirely different stage—namely, the formation of pyruvic acid from phosphoglyceric acid. Pyruvic acid removes this inhibiting effect.

3. Glyceraldehyde, a 3-carbon sugar, in very low concentrations inhibits the glycolysis of cancer tissue, the respiration being unaltered. The carbohydrate metabolism of the cancer cell is thus changed into one resembling a normal cell. Pyruvic acid here too removes the inhibiting effect.

4. Dihydroxyacetone, another 3-carbon sugar, inhibits the respiration of cancer cells without affecting either aerobic or anaerobic glycolysis. (The reverse of glyceraldehyde.)

5. Saccharic acid, $COOH(CHOH)_4COOH$, has no effect on anaerobic glycolysis, but inhibits respiration and aerobic glycolysis of cancer cells.

6. Pyruvic acid strongly stimulates the glycolysis of cancer and normal cells. In this respect it confers the cancer type of metabolism on normal cells. It now seems certain that the glycolysis activator which occurs in large amounts in cancer tissue (co-ferment T) is identical with pyruvic acid.

The meaning of these observations is not yet clear, but they do show that it is possible by chemical means to influence the carbohydrate metabolism of the cancer cell and so give promise of further advances.

Enzymes are associated with all the processes in a very intimate and necessary way, and the action of the specific chemical substances upon chemical metabolism is through these enzymes. This shows the importance of molecular structure in determining the properties of living systems. Enzymes are the catalysts of the living cell and display their influence at colloidal or other surfaces within the cell. If colloidal structures did not display highly specialised molecular structure at their surface there would be no reaction, for it is here that catalysis occurs.

"A molecule § within the system of a cell may remain in an inactive state and enter into no reactions, until at one such surface, it comes in contact with an enzyme structure which displays certain adjustments to its own structure. While in such association the inactive molecule becomes (to use a current term) 'activated' and then enters on some definite path of change. The one aspect of enzyme catalysis which for the sake of my theme, I wish to emphasise, is its high specificity. An enzyme is in general adjusted to come into effective relations with one molecule only, or at most with molecules closely related in their structure. . . . A living cell is the seat of a multitude of reactions and, in order that it should retain at a given environment its individual identity as an organism, these reactions must be highly organized. They must be of determined nature and proceed mutually adjusted with respect to velocity, sequence and in all other relations. . . . Materials for the maintenance of the cell enter it from the environment. Discrimination among such materials is primarily determined by permeability relations, but of deep significance, in that selection is the specificity of the cell catalysts. . . . Any molecule which does meet an adjusted catalyst cannot fail to suffer change and become directed into some one of the paths of metabolism."

Hopkins emphasises the directive and selective action of enzymes in saying:—

"It must here be remembered, moreover, that enzymes as specific catalysts, not only promote reactions, but determine their direction. The glucose molecule, for example, though its inherent chemical potentialities are, of course, always the same, is converted into lactic acid by an enzyme system in muscle, but into alcohol and carbon dioxide by another in the yeast cell. It is important to realise that diverse enzymes may act in succession and that specific catalysis has directive as well as selective powers."

This is sufficient to show that the enzymes, the biological catalysts, are the means whereby the cells of the body do their chemical work. Enzymes exist in three component systems, substrate plus catalyst plus activator, or, if you prefer, the last two terms may be stated as catalyst plus catalyst-promotor. There are in existence already certain anti-enzymes or inhibitors, or these may be called catalyst poisons. We have ourselves in our laboratories found new ones. If, as our present research seems to indicate, there are certain enzymes more definitely associated with cancer growth, and if a definite equilibrium of enzymes is required in cancer, there is at least a mechanism whereby these conditions may be altered. This opens a very hopeful field.

We have studied certain of the enzymes in cancer in our laboratories. The enzymes of two transplantable rat tumours were investigated, one the Philadelphia No. 1, a fibroid sarcoma, and the other, the Walker 256, a rather necrosing carcinoma. These

§ The presidential address before the British Association for the Advancement of Science, by Sir Frederick Gowland Hopkins, entitled Some Chemical Aspects of Life, is most illuminating and beautifully written. It may be found in Nature, 1933, cxxxii., 381 (see also THE LANCET, 1933, ii., 573). I quote freely from it here in regard to enzymes.

tumours were chosen on account of their different character and their constancy of reproduction.[3] With progressive maturation of the tumour, as estimated by the relative proportions of parenchymatous, necrotic, and fibrous portions, there was a decrease in cathepsin, phosphatase, adenylic acid deamidase, and guanine deamidase, and an increase in arginase content. The enzymes which decrease are believed to occur almost exclusively in the diminishing parenchyma, while the arginase occurs predominantly in the increasing necrotic tissue. Another striking observation is the change in the activation of the cathepsin and arginase with advancing maturity of the tumour. As the parenchyma diminishes and necrotic tissue increases, the proportion of fully active cathepsin decreases and the proportion of fully active arginase increases.

In these proteolytic enzymes, the enzyme content of the tumour is qualitatively similar to that of normal organs, but differs in amount. Arginase occurs in tumours in the same amounts as in the liver, and is not found at all in normal muscle. Adenylic acid deamidase is found in much greater amounts in muscle than in tumours or liver.

In cancer-bearing animals, as compared with control animals, there is a difference in the enzyme content of certain of the organs, although the tumour was not located in these organs, but in a distal part. In the cancer-bearing animals the content of cathepsin and arginase in the liver is reduced, the phosphatase content of the kidney is increased. Many of the enzymes are more or less localised in special organs of the body, as, for example, phosphatase in the kidney; but tumour contains them all, and so may be regarded as a non-specific organ in regard to enzymes. Not only were the ubiquitous intracellular enzymes found in the tumours, but also those enzymes which are normally located in organs, and in amounts similar to those in their own specific organs. There are two great classes of protein enzymes, the hydrolytic or breaking-down enzymes and the synthesising or building-up enzymes. The first probably prepares the pabulum in cell growth for the building-up enzymes. The ones discussed here are the hydrolytic and it seems as if there is an enzyme equilibrium of these for the various phases of tumour growth.

Certain further study of the enzyme phosphatase was done in our laboratories by Koehler.[3]

Phosphatase normally occurs in the kidney, and a study of the kidney phosphatase was done in the normal albino rats, in the cancer-bearing albino rats, and in rats of the Wistar strain which are relatively resistant to our transplanted tumours. In the resistant Wistar rats the phosphatase of the kidney was relatively high, and the kidney phosphatase of the cancer-bearing albino was much lower than that of the resistant Wistar rats. The normal non-inoculated albino rat had a slightly higher kidney phosphatase than that of the cancer-inoculated albino. In certain of the albino strain which are generally susceptible to these tumours, but in which the tumour failed to "take," the kidney phosphatase was high.

The reverse was true in the phosphatase in the blood. In the resistant rats it was low, and in the cancer-bearing rats' blood it was generally higher. In the blood of human patients with cancer it was relatively higher than in normal human blood, but of course the kidney content could not be studied. There were also differences in regard to percentage of activity of the phosphatase in the various animals, resistant, normal albino, and cancer-bearing albino.

This work gives some indication that enzymes may be associated with resistance to cancer or at least may be coincidentally changed one way or another. Here again there are promising openings for study—not only in regard to the proteolytic enzymes, but also as to the oxidases.

The study of enzymes is bound up not only with organs, but also with glandular hormones and vitamins which are also catalysts. Purr,[4] in our laboratory, has shown for the first time that there is a possible relation between vitamins and enzymes. He found that ascorbic acid (crystalline vitamin C) with iron was an activator of the enzyme arginase, an enzyme very important in cancer. The relation of hormones and vitamins to the activation of enzymes raises the question of the mechanism of their action. The answer to this waits for the production of these substances in constant concentration or crystalline form, but is going forward here with such hormone products as are in pure form.

It will be seen that much has already been learnt about the chemical metabolism of the cancer cell and its relation to enzymes and their effect, although it is only a few years since Warburg's first discoveries. The problem needs the attention of many minds as well as the constant concentration of the few. The fact that the enzyme acts as a catalyst which directs the course of the reaction as well as entering into it, and that these catalysts are present in minute amounts and may be activated or promoted, inhibited or poisoned, by activators or anticatalysts of still less amounts, makes the possibility of success much greater. The solution requires more work and fuller knowledge, but there is no need of despair or defeatism about the progress of cancer research.

REFERENCES

1. Dickens, F., and Simer, F.: Biochem. Jour., 1930, xxiv., 1301.
2. Waldschmidt-Leitz, E., McDonald, E., and co-workers: Zeits. f. physiol. Chem., 1933, ccix., 115.
3. Koehler, F.: Ibid., 1934, ccii., 98.
4. Purr, A.: Biochem. Jour., 1933, xxvii., 1703.

ASPIRATION OF NUTS INTO THE BRONCHI

THE disease usually described as "impacted peanut in the lung" is commoner in the United States than in this country, and Lyman G. Richards and John Walker are able to report on 26 cases under their care in the Children's Hospital, Boston (New Eng. Jour. Med., Oct. 1st, 1934, p. 653). The important points in the diagnosis are: first, a history of association with nuts; secondly, the presence of a persistent irritating cough; and thirdly, the discovery of physical signs appropriate to incomplete obstruction of one or more lobes of a lung. These signs are unilateral limitation of expansion, hyper-resonance to percussion, and absence or diminution of breath sounds, and their cause is ball-valve obstruction in a bronchial tube, with limitation of air entry during inspiration and much more definite obstruction during expiration.

From the careful analysis given by Richards and Walker, it appears that once the condition is suspected the history and signs will usually be definite enough for a confident diagnosis. In 19 of their 26 cases a history of aspiration symptoms—such as choking or violent coughing accompanied by some cyanosis—was given voluntarily by the parents. In a further five, questioning elicited the history. A suggestion on the part of the parents that aspiration may have occurred should always be taken seriously, for it was found that wherever this suggestion was made there was actually a foreign body present. Cough seems to have been the one almost constant symptom; it was either harsh and brassy or loose and moist, the latter type being usually due to a purulent reaction. Urgent dyspnœa and cyanosis were not prominent symptoms, and should not be awaited before making a diagnosis. Only one patient was acutely ill; the average temperature in the 26 cases was 100° F., and the average pulse-rate 123. Considering that the children were all under 4 years of age this did not indicate a severe toxic reaction.

Radiography cannot, of course, be expected to demonstrate the presence of the nut, but it may give valuable indirect evidence. Thus aeration of one lung at the end of *expiration*, contrasting with the denser shadow of the normal deflated side, suggests interference with the egress of air. Later the changes in the affected lung may interfere with its expansion, and the radiographic picture now demonstrates failure of aeration at the end of full *inspiration*. The former is the more important diagnostic sign.

Removal of the nut through the bronchoscope in a child is difficult, and Richards and Walker are to be congratulated on obtaining 25 complete successes in their 26 cases. They believe that it is best to work without anæsthesia, but that this, as a rule, is possible only if the operator is skilful and experienced and has skilled assistants. Ether should not be used, both because of the mucous-bronchial secretion it excites and because any respiratory difficulty is rendered more serious with the patient fully anæsthetised. Avertin per rectum they employed in 11 of their cases, the dose varying from 80 to 100 mg. per kg. body-weight, and the results were good. Local reaction to the presence of the nut—e.g., œdema of the bronchial wall and purulent secretion—are likely to be encountered in cases first seen three weeks after the accident, and this complicates the removal of the foreign body. Where the nut breaks during its extraction, great care has to be used to remove the pieces. If one of them drops into the bronchus of the sound side the result may be serious, and there must be no delay in getting it out again.

A PSYCHOLOGICAL STUDY

Mr. Thornton Wilder is on the staff of Chicago University and probably has personal knowledge of the difficulty which teaching authorities and fellow students alike have in meeting extravagant demonstration of piety on the part of a youth when the religious side of what he does is significant only to himself. The hero of his latest book [1] is a commercial traveller in the interest of educational text-books; he is too good for the work-a-day world, and his duties as salesman get involved with his communistic doctrines, his admiration of Gandhi, and his conviction that the use of alcohol and tobacco is an act of irreligion. How "George Mervin Brush, representing the Caulkins Educational Press, New York, Boston, and Chicago," set before all sorts and conditions of men the problems involved in treating him fairly makes amusing reading, and good opportunity is taken by the author to supply descriptions of typical persons and places.

A PORTABLE BURGLAR ALARM

A FIRM trading aptly under the name of Alarm Bags (Gt. Britain) Ltd. (35, Hatton-garden, London, E.C.1) is putting on the market leather bags, ranging from attaché cases upwards, which are said to be burglar-proof. For an electrical device, concealed in the bottom of the case, is connected with a battery and when the case is snatched from the owner a siren, which will protest for three hours, comes into operation and the siren will not stop until the case is unlocked. Strong locks are fitted to the bags and every key is cut differently. A switch inside the bag enables the owner to place it on the ground or on the seat of a car secure in the knowledge that directly the bag is either lifted or tilted the alarm will sound; and when this happens the alarm cannot be stopped by replacing the bag on the ground; the bag must be unlocked in order to break the electrical circuit. It is obvious that certain inconveniences might arise if the sensitive nature of an attaché case, placed on floor or seat of a public vehicle, were not known to those who might in all innocence shift it; but the alarm bag may have its special attraction for doctors. In view of the number of thefts recently from doctors' cars, bags, with the burglar-proof fitting, are being manufactured fitted with drawers and trays suitable for drugs and instruments, while cases can be made to meet the requirements of individual practitioners at prices ranging from £7 10s. upwards. The battery, the average life of which is one year, is sold at 5s. It is stated that possessors of "Alarm" bags can obtain reductions in insurance premiums.

[1] Heaven's My Destination. By Thornton Wilder. London: Longmans Green and Co., Ltd. 1934. Pp. 245. 7s. 6d.

THE ANGLO-FRENCH DRUG COMPANY (11 and 12, Guilford-street, London, W.C.1) have sent us a copy of their A.F.D. block diary for 1935, with a page 6 by 4 in. of nearly blank paper for daily memoranda. It is bound in black cloth and may serve as a useful accessory to the writing table.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED DEC. 15TH, 1934

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 3507; diphtheria, 2102; enteric fever, 27; acute pneumonia (primary or influenzal), 966; puerperal fever, 39; puerperal pyrexia, 114; cerebro-spinal fever, 16; acute poliomyelitis, 11; acute polio-encephalitis, 1; encephalitis lethargica, 11; dysentery, 11; ophthalmia neonatorum, 88. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Dec. 21st–22nd was as follows: Small-pox, 0 under treatment, 0 under observation; scarlet fever, 1705; diphtheria, 2166; measles, 180; whooping-cough, 250; puerperal fever, 22 mothers (plus 10 babies); encephalitis lethargica, 266; poliomyelitis, 8; "other diseases," 274. At St. Margaret's Hospital there were 17 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 121 great towns, including London, there was no death from small-pox, 3 (1) from enteric fever, 2 (0) from measles, 6 (0) from scarlet fever, 7 (3) from whooping-cough, 69 (16) from diphtheria, 38 (15) from diarrhœa and enteritis under 2 years, and 46 (7) from influenza. The figures in parentheses are those for London itself.

Deaths attributed to influenza are on the wane, the totals for the last few weeks (working backwards) being 46, 56, 64, 61. This week they were distributed over 31 great towns, Preston reporting 4, Liverpool and Birmingham each 3. There were 8 deaths from diphtheria at Leeds, each 3 at Huddersfield, Liverpool, Sheffield, and Birmingham.

The number of stillbirths notified during the week was 261 (corresponding to a rate of 42 per 1000 total births), including 29 in London

Medical Diary

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
WEDNESDAY, Jan. 2nd.
Surgery. 8.30 P.M. Short Papers, including Mr. G. C. Knight and Mr. W. A. D. Adamson: Achalasia of the Cardia. Mr. C. Flemming (London): Subacute Staphylococcal Arthritis of Spine.
THURSDAY.
Tropical Diseases and Parasitology. 8.15 P.M. Dr. W. M. Willoughby: Some Diagnostic Experience on Shipboard with special reference to Plague. Dr. F. H. White: Plague, its Prevention and Modern Legislation.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY, Jan. 4th.—4 P.M., Mr. Harold Kisch: The Tonsil and Adenoid Problem.

CANCER HOSPITAL (FREE), Fulham-road, S.W.
THURSDAY, Jan. 3rd.—4 P.M., Mr. R. H. Jocelyn Swan: Cancer of the Kidney.

LONDON SCHOOL OF DERMATOLOGY, 49, Leicester-square, W.C.
TUESDAY, Jan 1st.—5 P.M., Dr. A. C. Roxburgh: Syphilis.
THURSDAY.—5 P.M., Dr. J. M. H. MacLeod: Ringworm Infections. (Chesterfield lectures.)

BRITISH RED CROSS CLINIC FOR RHEUMATISM, Petoplace, N.W.
THURSDAY, Jan. 3rd.—8.30 P.M., Mr. M. Oldershaw: Some Pelvic Causes of Rheumatism in Women.

LEEDS PUBLIC DISPENSARY AND HOSPITAL POST-GRADUATE COURSE.
WEDNESDAY, Jan. 2nd.—4 P.M., Dr. H. H. Moll: Asthma and Allergic Diseases.

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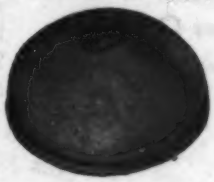

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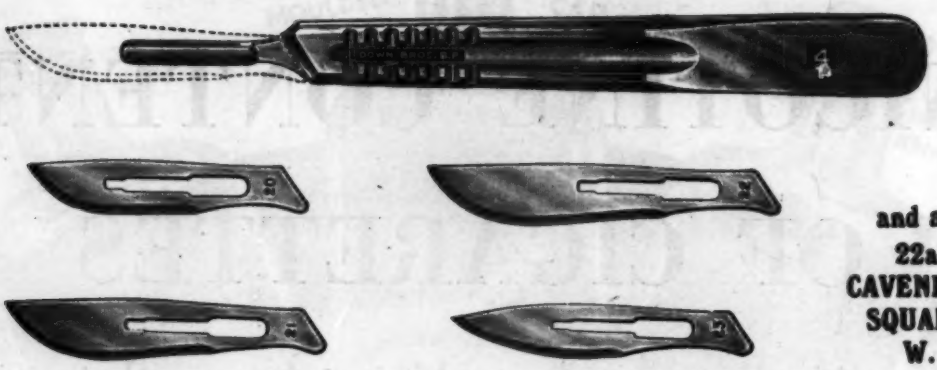

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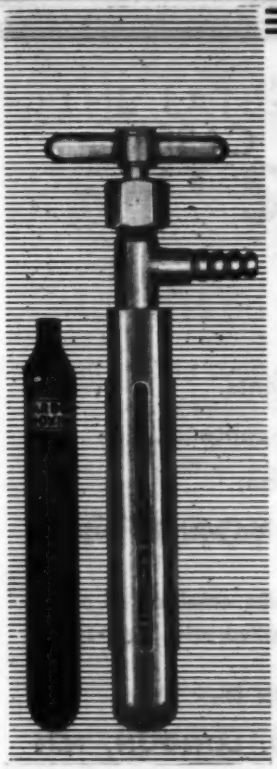

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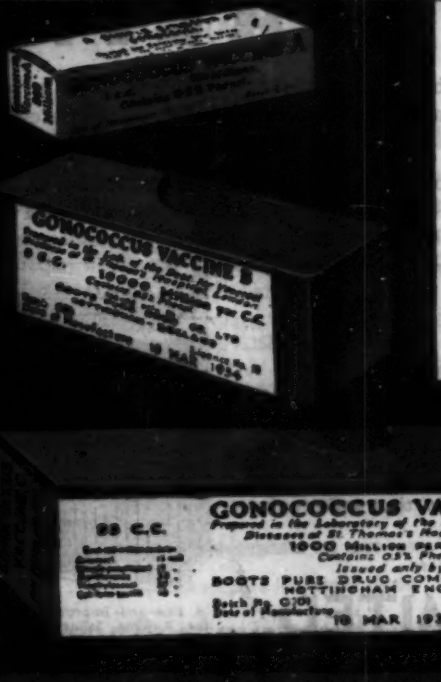
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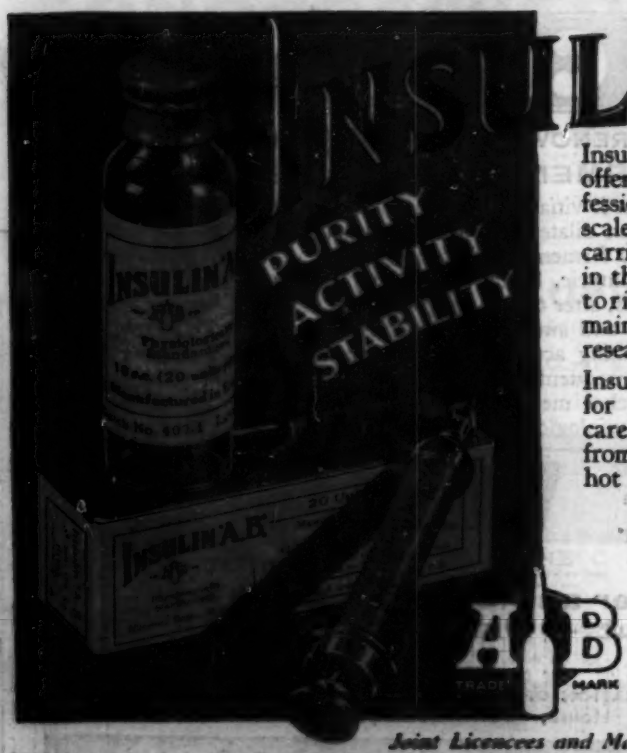

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Complete chemical history of "Alocol," with convincing clinical reports and supply for trial, sent free to physicians on request.

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M803

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Safe Salicylate Therapy

THE popularity of acetyl-salicylic acid is undoubtedly due to the fact that it is one of the safest and most effective non-narcotic analgesics available. Too often, however, its use has been discarded by the physician on account of its tendency to irritate the stomach and because entirely pure preparations are not always available.

"Alasil" provides the beneficial therapeutic effects of pure acetyl-salicylic acid in such a form that it is acceptable even by disordered digestions. This tolerability is due to the fact that it combines calcium acetyl-salicylate—the least irritating salicylate compound—with "Alocol," a potent gastric sedative and antacid.

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M807

Prostatic Hypertrophy

Extract from a doctor's letter:

With regard to my own case, my prostate was so enlarged when examined by a consultant two years ago after sudden hæmaturia from a chill, that he could scarcely get the cystoscope past the lateral lobes, and he was uncertain as to whether it was malignant or not, but strongly urged an operation within the next three months. It would have upset my plans so terribly to have to lie up then, that I took the suggestion of an old medical friend and put myself under "Opocaps" Prostatic (B.O.C.) with occasional Hexamine or Pyramidon.

There was no noticeable response until about the third month, by which time, unconsciously, I became slowly normal as to symptoms, and I have remained so ever since. It was interesting to note that when I remitted the gland treatment for a few months in the summer the symptoms recurred, but vanished after resuming the treatment.

Since my own experiences, I have put four patients on the treatment (including two doctor friends), and the results have been the same as in my own case.

I have proved that it is of no use to give just a few capsules, but that it is necessary to continue the treatment for at least three months before good results obtain, and it is essential to prescribe the correct preparation—"Opocaps" Prostatic (B.O.C.). **M.D.**

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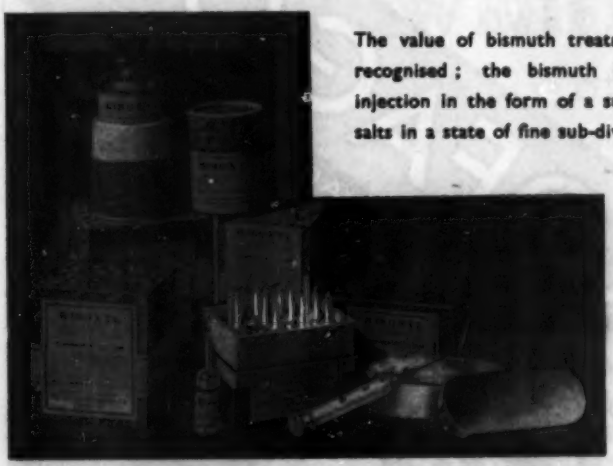

The value of bismuth treatment in syphilis and yaws is now well recognised; the bismuth is best administered by intramuscular injection in the form of a suspension of one of its sparingly soluble salts in a state of fine sub-division.

Bisoxyl is such an aqueous suspension of bismuth oxychloride presented in so fine a state of sub-division that, when injected, the bismuth is absorbed slowly and regularly; hence Bisoxyl injections are practically painless and, at the same time, therapeutically effective.

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Each box contains

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2 ,,	Camphor.	1 ,,	Lobeline.
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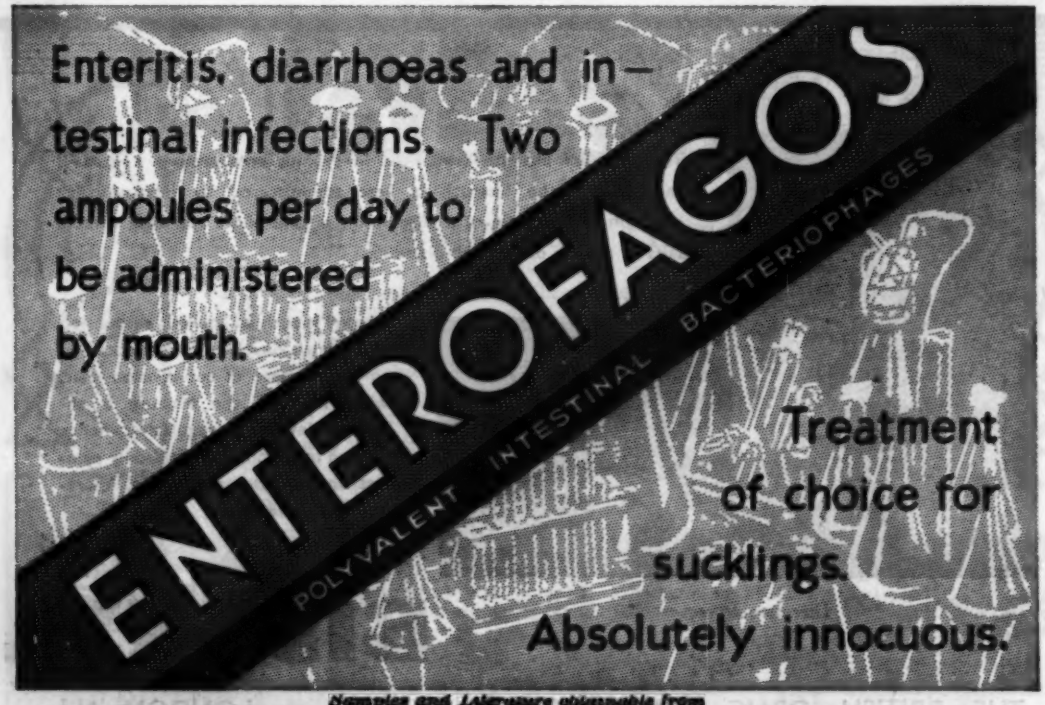
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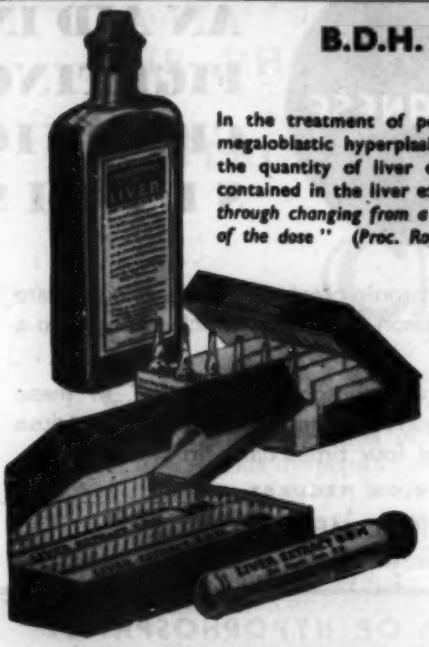

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In the treatment of pernicious anaemia and those other anaemias associated with megaloblastic hyperplasia of the bone marrow, it is an accepted fact that it is not the quantity of liver extract administered but the proportion of potent material contained in the liver extract that is of importance; indeed "*. . . patients go downhill through changing from a strong to a weak or unsuitable extract of liver without alteration of the dose*" (*Proc. Royal Soc. Med.*, March, 1933, p. 607).

In regard to the maintenance dose, "*. . . the golden rule . . . is to give enough effective substance to keep the blood count normal, and to increase the dose if any signs of spinal degeneration appear*" (*B.M.J.*, June 24th, 1933, p. 1091).

When prescribing one or other of the under-mentioned B.D.H. preparations of liver the physician is assured that his patients will receive "*enough effective substance*," whether it be required for the establishment of a normal blood count or for the maintenance of it.

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Imperfect digestion of starch produces the well-known symptoms of amylaceous dyspepsia; deficient bile circulation prevents satisfactory metabolism of fats; inadequate protein digestion is accompanied by lack of stimulation of normal peristalsis.

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Cicfa, by virtue of its diastasic and peptonising ferments:—

Aids digestion of starch.
Ensures adequate stimulation of the bile circulation.
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Allows full absorption of the nutritive elements of the diet.
Stimulates normal peristalsis and satisfactory elimination of waste matter.
Restores normal function in every portion of the gastro-intestinal canal.

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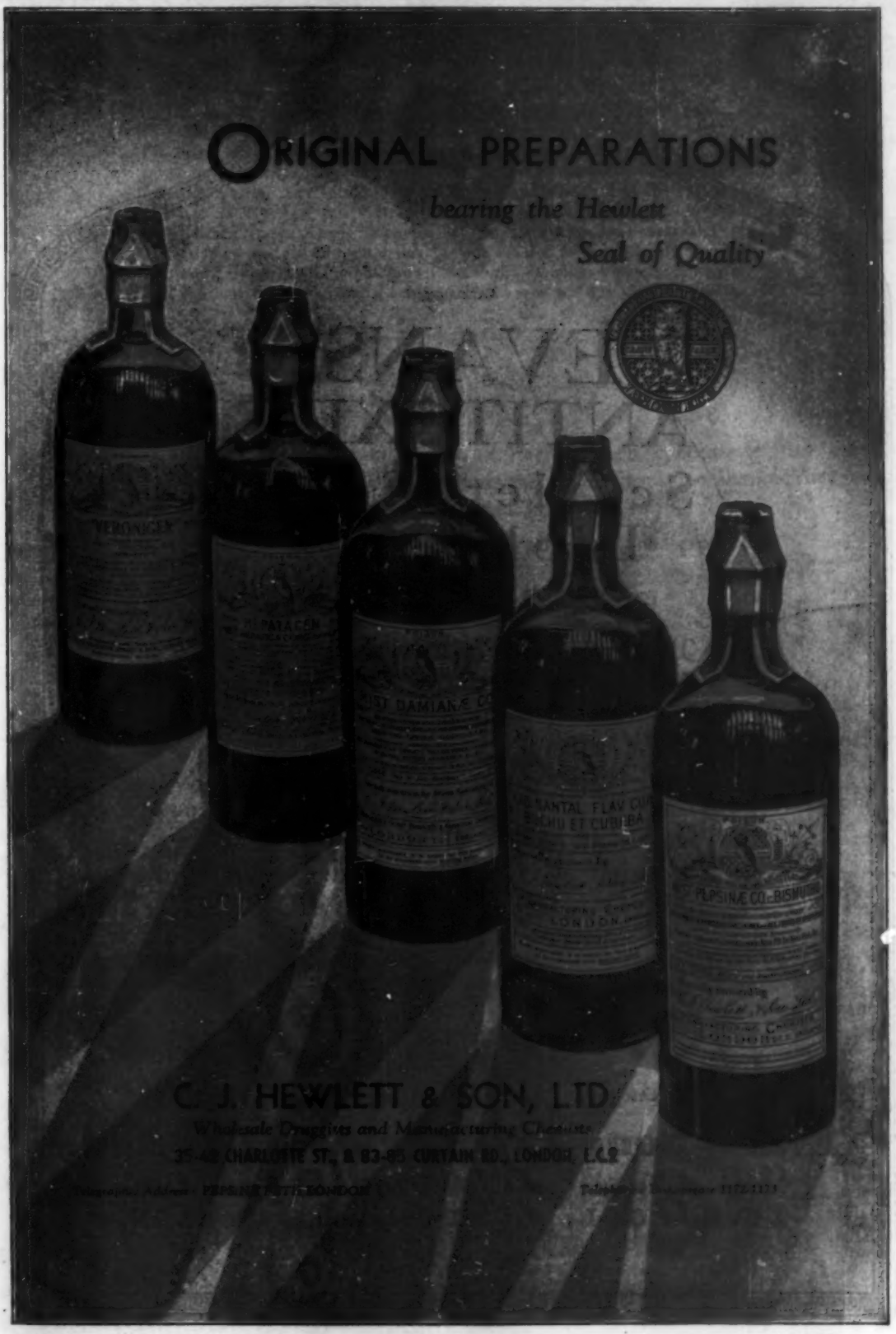
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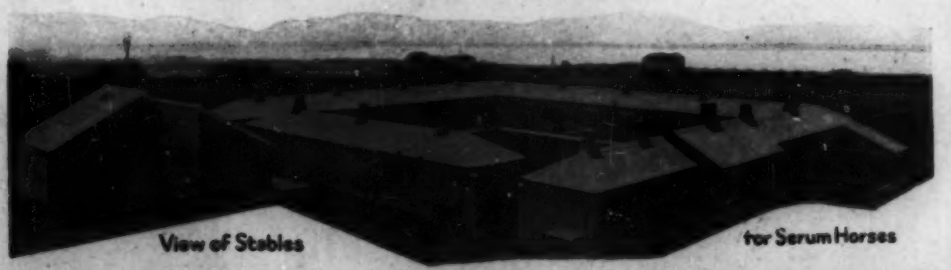

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For the Intensive Alkaline Treatment of Gastric and Duodenal Ulcers

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Sod. Bicarb.	2 parts
Mag. Carb.	4 parts
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Bism. Carb.	1 part

This is the standard preparation.

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Sod. Bicarb.	2 parts
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Specially suitable for cases in which a bismuth-free preparation is desired.

Formula D

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Formula F

Calc. Carb.	4 parts
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Contains neither bismuth carbonate nor sodium bicarbonate.

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'Osmo' Kaolin	2 parts

The bismuth is replaced by colloidal kaolin, which possesses marked toxin-adsorbing properties.

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Each lozenge contains 15 grains.

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In 4 oz. and 8 oz. bottles.

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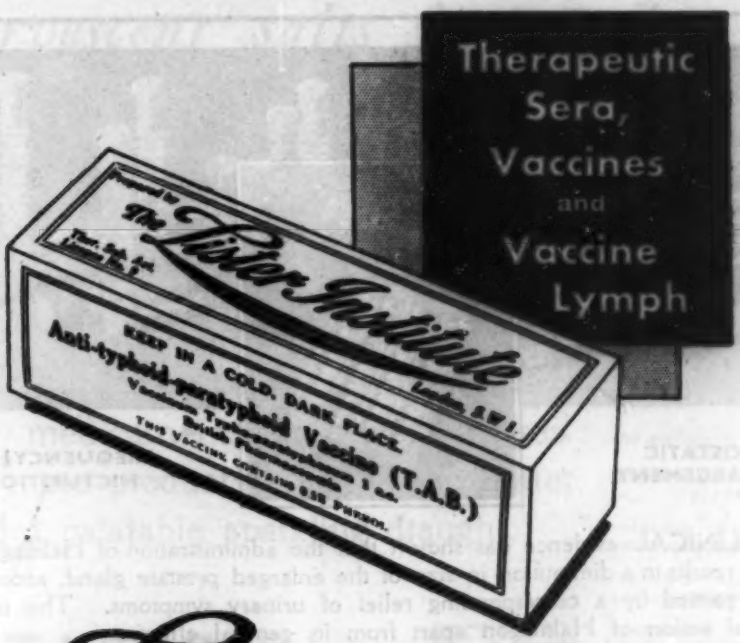

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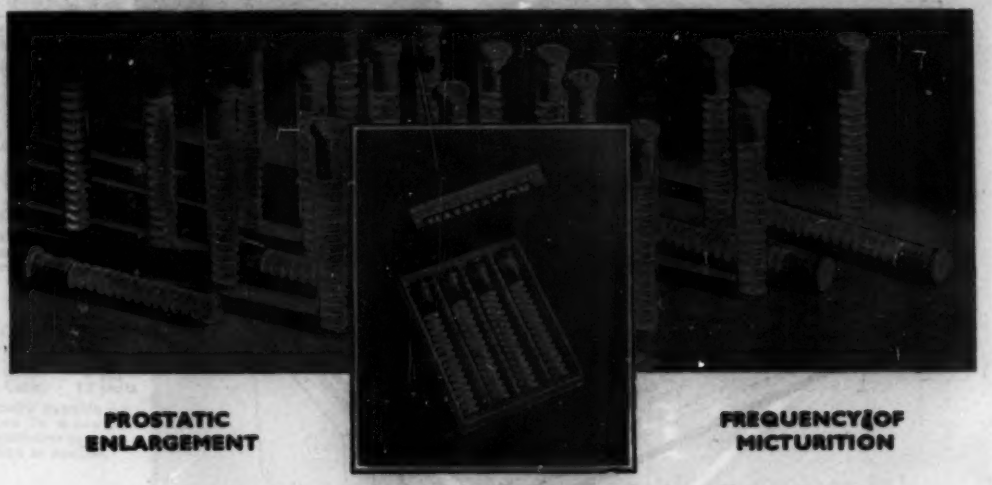

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Alkaline Compound Effervescent

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Sodii Bicarbonatis,	*gr.* 5 (0·324 *gm.*)
Calcii Lactophosphatis,	*gr.* 3 (0·194 *gm.*)
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Salis Effervescentis,	*q.s.*

A well-balanced formula. Acts as a systemic alkaliniser. The citrates formed on solution are changed into bicarbonates in the tissues.

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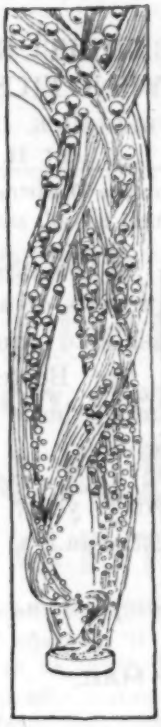

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* Proc. Roy. Soc. Med., Vol. II., No. 8, June, 1909. The Lancet, 1920, Vol. cxcviii, p. 1150.

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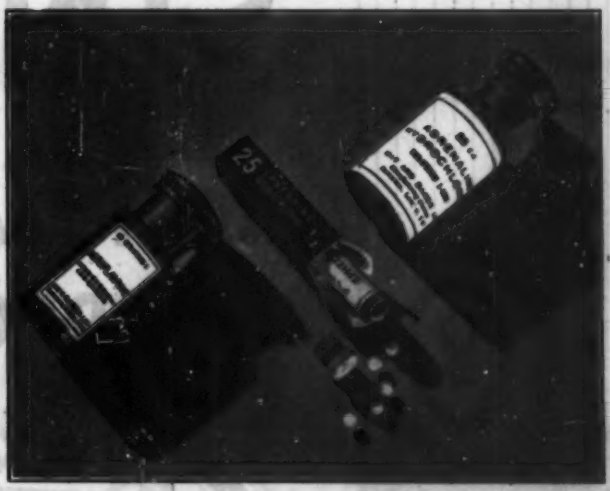

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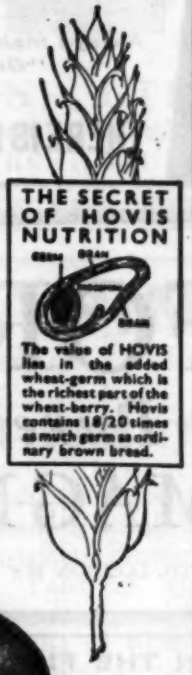
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For the treatment of GENTLEMEN. Established 1863 as a self-supporting home by an association of prominent medical men and others for the study of inebriety; Voluntary patients under the Inebriates Act can be received. Large secluded grounds on the banks of the River Colne. Full-sized billiards, tennis, croquet, bowls, workshop. Golf (Moor Park and Sandy Lodge) close by. Moderate terms.—Apply to F. S. D. HOGG, M.R.C.S., &c., Res. Med. Supt. Telephone: 16 Rickmansworth.

ALCOHOLISM & OTHER DRUG HABITS

THE HARE NURSING HOME.

As founded and established by the late Dr. FRANCIS HARE for 20 years Med. Supt. of The Norwood Sanatorium and author of "Alcoholism" etc.; for the treatment of ALCOHOLISM other Drug Habits, Insomnia, Neurasthenia, Functional Nervous Disorders, etc.

"THE OLD HILL HOUSE," CHISLEHURST, KENT.

Fees 5 to 10 guineas. 25 bedrooms, ample amusements.
Annexe for Mild Cases. Quiet and pleasant situation.

Ladies and gentlemen admitted for treatment.

For Prospectus, etc., write or phone, Dr. E. H. GRIFFIN, D.S.O., M.C., M.R.C.S., (Res. Med. Supt.).
'Phone: Chislehurst 451.

ALCOHOLISM AND NEURASTHENIA

CALDECOTE HALL, Nr. NUNEATON.

At this beautifully situated country mansion residential treatment of the above afflictions is carried out on the most modern scientific principles, both physical and psychological, under the supervision of the Res. Med. Supt., Dr. A. E. CARVER, M.D., D.P.H., D.P.M. Fees moderate.
Particulars may also be obtained from the Cent. Sec., 40, Marsham-street, London, S.W.1.

SPRINGFIELD HOUSE

Phone: BEDFORD 3417. **Near BEDFORD**

For Mental Cases with or without Certificates.

Ordinary Terms: Five Guineas per week (including Separate Bedrooms for all suitable cases without extra charge).

For terms of admission, &c., apply to the Resident Physician, ORMOND W. BOWER, as above, or at 5, Duchess-street, Portland-place, W.1, on Tuesdays from 4 to 5.

NORTHUMBERLAND HOUSE

GREEN LANES,

FINSBURY PARK, N.4.

A PRIVATE HOME for the treatment of patients of both sexes suffering from Mental Illnesses.

Six acres of ground, highly situated, facing Finsbury Park.

Voluntary Patients and Temporary Patients received without certification. Convalescent Home, KRABSEY COURT, DOVER

For further particulars apply to the Medical Superintendent
Tel. North: 0888. Telegrams: "SUBSIDIARY, LONDON."

LITTLETON HALL, BRENTWOOD, ESSEX

(18 MILES FROM LONDON.)
400 feet above sea.

HOME for few LADIES Mentally Afflicted. Large grounds. Liverpool st. 26min. Stations Brentwood, Shenfield, one mile. Boarders received.

Apply Dr. Haynes, Telephone and Telegrams: Haynes Brentwood 45.

CHISWICK HOUSE

A PRIVATE MENTAL HOSPITAL FOR THE TREATMENT AND CARE OF MENTAL AND NERVOUS DISORDERS OF BOTH SEXES.

Now removed to—

CHISWICK HOUSE, PINNER, MIDDLESEX.

Telephone: Pinner 234.

A modern country house, 12 miles from Marble Arch, in beautiful secluded grounds.

Fees from 10 guineas per week inclusive.

Cases under certificate and Voluntary Patients received for treatment.

Special provision for "Temporary" Patients under the new Mental Treatment Act. DOUGLAS MACAULAY, M.D., D.P.M.

BARNWOOD HOUSE, GLOUCESTER.

A REGISTERED HOSPITAL FOR THE CARE AND TREATMENT OF LADIES AND GENTLEMEN SUFFERING FROM NERVOUS AND MENTAL DISORDERS.

Within two miles of the G.W. Railway and L.M. & S. Railway Stations at Gloucester, the Hospital is easily accessible by rail from London and all parts of the United Kingdom. It is beautifully situated at the foot of the Cotswold Hills, and stands in its own grounds of over 280 acres. Voluntary Boarders of Both Sexes are also received for treatment.

Special accommodation for Lady Voluntary Boarders is also provided at the MANOR HOUSE, which has its own private grounds and is entirely separate from the main Hospital.

For particulars as to terms, &c., apply to ARTHUR TOWNSEND, M.D., Medical Superintendent.

Telephone: No. 6207 Barnwood.

Telegraphic Address: "Relief, Old Catton." Telephone: 290 Norwich

NERVOUS & MENTAL AFFECTIONS

Ladies only received

The Grove, Old Catton, Norwich.

A High-class Home for the Curative Treatment of Nervous Affections. Voluntary Boarders are also received without certificates.

For full particulars apply to the Misses McLINTOCK, or to Dr. S. BARTON, 34, Surrey-street, Norwich. Visiting Physician.

Grove House, All Stretton, Church Stretton, Shropshire.

A PRIVATE HOME for the care and treatment of a limited number of Ladies Mentally Afflicted.

Climate healthy and bracing.

Apply to Dr. McCLINTOCK, Proprietor and Resident Medical Superintendent.

The Princess Elizabeth of York

HOSPITAL FOR CHILDREN, SHADWELL, E.1.

APPOINTMENT OF DERMATOLOGIST.

Applications are invited for the post of Dermatologist for the above Hospital. Applicants must be Fellows or Members of one of the Royal Colleges of Physicians of the United Kingdom.

Applications, marked "Dermatologist," stating age, qualifications, and experience, together with copies of at least three testimonials, are to be forwarded to the undersigned.

J. F. RUSSELL, Secretary-Superintendent.

Royal College of Surgeons of England.

ELECTION TO COURT OF EXAMINERS.

Notice is hereby given that the Council, on August 2nd next, will proceed to the election of a Member of the Court of Examiners, in the vacancy occasioned by the resignation of Mr. Claude H. S. Frankau.

Fellows of the College desirous of becoming candidates for the office must make application in writing to the Secretary on or before Wednesday, 25th July.

7th July, 1934. S. FORREST COWELL, Secretary.

The Prince of Wales's General Hospital, London, N.15.

The Governing Body of the Prince of Wales's General Hospital invite applications for the appointment of HONORARY PHYSICIAN to the Children's Department.

Candidates must be Graduates of a recognised British University, and Fellows, or Members of the Royal College of Physicians of London, and engaged in Consulting Practice only. Applications, together with copies of three testimonials, to be sent to the undersigned on or before Wednesday, July 11th

J. C. BURDETT, Director.

East Ham and Southend-on-Sea Joint Mental Hospital.

MEDICAL SUPERINTENDENT.

The Joint Visiting Committee invite applications from legally qualified and registered medical practitioners for the appointment of Medical Superintendent at their Mental Hospital now in course of erection at Runwell, Essex.

The Institution is designed to accommodate 875 beds.

Applicants must be under forty-six but not less than thirty years of age.

The salary will be £900 per annum, rising by annual increments of £50 a year to £1200 plus a house, which, with other usual residential emoluments, are provisionally valued at £200 a year.

Applications must be made upon a prescribed form, which, together with particulars and conditions of the appointment, may be obtained from the undersigned, to whom they must be returned, accompanied by copies of not more than three recent testimonials, not later than first post, the 16th day of July, 1934, endorsed "Medical Superintendent."

Canvassing the Members of the Committee, either directly or indirectly, is prohibited and will disqualify.

(Sgd.) C. EUSTACE WILSON,
H. J. WORWOOD,
Clerks of the Joint Committee.

Town Hall, East Ham, E.6, 22nd June, 1934.

St. John's Hospital, Lewisham, S.E.13.

Applications are invited to fill the office of HONORARY SURGEON to the Hospital from candidates who are Fellows of the Royal College of Surgeons of England. The successful candidate will have charge of beds and be required to take one out-patient clinic weekly. Applications, with copies of testimonials, should be addressed to the undersigned, who will be pleased to give any further information required. They should reach him not later than Friday, July 20th, 1934.

By Order of the Court of Governors,

J. C. GILBERT, Secretary-Superintendent.

St. John's Hospital, Lewisham, S.E.13.

Applications are invited for the Resident appointments of HOUSE PHYSICIAN and CASUALTY OFFICER (Male) vacant on the 1st August, 1934. Tenable for six months. Remuneration £100 per annum.

Applications, with copies of testimonials, should reach the undersigned by Thursday, 12th July.

J. C. GILBERT, Secretary-Superintendent.

London Hospital, E.1.

Applications are invited for the post of HONORARY ASSISTANT ANÆSTHETIST.

Candidates must be fully qualified medically.

Applications, with testimonials, should be sent to the House Governor and should arrive not later than on Saturday, July 14th.

Further particulars of the appointment may be obtained from the House Governor.

June 26th, 1934 ARTHUR G. ELLIOTT, House Governor.

Hampstead General and North-West London Hospital, Haverstock-hill, N.W.3.

APPOINTMENT OF HOUSE PHYSICIAN.

Applications are invited from unmarried medical men for the appointment of House Physician vacant on August 1st next. The salary will be at the rate of £100 per annum, together with board, residence, &c., and the term will be for six months.

Applications, to be made on a form which will be supplied by the Secretary, together with copies of not more than three testimonials, should reach the Secretary not later than noon on 21st July next.

Hampstead General and North-West London Hospital, Haverstock-hill, N.W.3.

APPOINTMENT OF CASUALTY SURGICAL OFFICER.

Applications are invited from unmarried registered medical women for the position of Casualty Surgical Officer at the Out-patient Department of the Hospital, Bayham-street, Camden Town, N.W., which will be vacant on September 1st next. The salary will be at the rate of £100 per annum, together with board, residence, &c., and the term will be for six months.

Applications, to be made on a form which will be supplied by the Secretary, together with copies of not more than three testimonials, should reach the Secretary not later than noon on 21st July next.

Research in Tropical Medicine.

WANDSWORTH SCHOLARSHIP.

THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE invites applications for the above Scholarship, which will be vacant in October next. The purpose of the Scholarship is Research in Tropical Medicine. Applicants should furnish a short memorandum on the problem of research which they propose to undertake, setting out their qualifications and previous experience. A medical qualification is desirable though not essential.

The Scholarship is worth £370 per annum, and is tenable for two years with a possible extension of one year. The scholar will be expected to spend a substantial part of his time overseas and will receive when so engaged a subsistence allowance of one pound a day and travelling expenses.

Applications, which must be received before 15th September, 1934, should be addressed to the Secretary, London School of Hygiene and Tropical Medicine, Keppel-street, Gower-street, London, W.C.1, from whom further particulars may be obtained.

The Victoria Hospital for Children, Tite-street, Chelsea, S.W.3. (138 Beds.)

The Committee of Management invite applications for the posts of HOUSE PHYSICIAN and HOUSE SURGEON (both vacant 1st August, 1934). The appointments are for six months. Salaries at the rate of £100 per annum, with board, lodging, and washing.

Candidates must attend the Hospital for the purpose of an interview at 5 P.M. on Friday, the 20th July, 1934. (No travelling or other expenses will be paid). They must hold medical and surgical qualifications, and be registered under the Medical Act.

Applications, with copies of three recent testimonials, should be sent to the Secretary not later than first post on Thursday, the 19th July, 1934.

By order.

D. ST. JOHN BAMFORD, Secretary.

Royal College of Surgeons of England.

BOARD OF EXAMINERS IN DENTAL SURGERY.

Notice is hereby given that the Council on the 2nd August will proceed to the election of four Physicians to conduct the Second Examination in Medicine, General Pathology, and Bacteriology of candidates for the Licence in Dental Surgery, and it is thought to be desirable that these Examiners should be on the Staff of a Medical or Dental School.

Candidates must make written applications to the Secretary on or before Wednesday, the 25th instant.

7th July, 1934. S. FORREST COWELL, Secretary.

Central London Throat, Nose, and EAR HOSPITAL, Gray's Inn-road, W.C.1.

RESIDENT HOUSE SURGEON (Male).

There will be a vacancy for a Third Resident House Surgeon to enter on duty on 1st September next. The appointment will be for a period of nine months: three months as Third House Surgeon, three months as Second House Surgeon, and three months as First House Surgeon. Remuneration at the rate of £75 per annum.

Applications, accompanied by copies of not more than three testimonials, should be sent to the undersigned on or before 10th July. JOHN H. YOUNG, Secretary-Superintendent.

The Weir Hospital, Grove-road, BALHAM, S.W.12.

JUNIOR RESIDENT MEDICAL OFFICER (Male, unmarried), required. Candidates must be fully qualified and duly registered. Salary £150 per annum, with board, residence, and laundry. Applications, with copies of testimonials, to be sent to the Secretary, from whom further information may be obtained.

The Willesden General Hospital, Harlesden-road, N.W.10.

Honorary Medical Staff:

PHYSICIAN TO THE SKIN DEPARTMENT.

The Council of Management invite applications for the above appointment. A copy of the regulations may be obtained from the Secretary of the Hospital to whom twenty-five copies of application should be addressed not later than Friday, 20th July, 1934.

King Edward Memorial Hospital, EALING. (130 Beds.)

Applications are invited for the post of JUNIOR RESIDENT MEDICAL OFFICER (Male) vacant on 1st August, 1934. Six months' appointment. Salary £150 per annum, with usual residential allowances. Applications, stating age, experience, and qualifications, together with copies of two recent testimonials, to be sent to the undersigned by Saturday, 7th July, 1934.

R. A. MICKELWRIGHT, Secretary-Superintendent.

The Hospital for Sick Children, Great Ormond-street, London, W.C.1.

Applications are invited from registered medical practitioners for the following non-resident appointments which become vacant on the 1st August, 1934:—

Three OUT-PATIENT SURGICAL REGISTRARSHIPS (Male.)

Salary £200 per annum (part-time).

The appointments are tenable for twelve months, but are renewable.

Candidates must be prepared to attend for interview at the Hospital on Wednesday, 25th July, 1934, at 4.45 P.M.

Applications, supported by not more than three testimonials, given specially for the purpose, must be submitted to the undersigned not later than Monday, 23rd July, 1934, from whom further particulars and forms of application may be obtained. HERBERT F. RUTHERFORD, Secretary.

June, 1934.

London County Council.

Applications invited from Medical Practitioners for appointment to the undermentioned positions. Duties are assigned by Medical Superintendents and include, if necessary, assistance at other establishments under Council's control. Married quarters are not available.

1. QUEEN MARY'S HOSPITAL (for Convalescent Patients), SIDCUP, KENT.—ASSISTANT MEDICAL OFFICER (Grade II.) Salary £250 a year, together with board, lodging, and washing, appointment for one year only and not renewable. Duties mainly medical. Candidates must be medical practitioners of at least one year's standing and have held a resident appointment in a general hospital for at least six months. There is no accommodation for a woman.

2. ST. GILES' HOSPITAL, Brunswick-square, Camberwell, S.E.—CLINICAL ASSISTANT. Salary £100 a year, with meals when on duty. Appointment is for six months only in the first instance.

Application forms obtainable (stamped addressed foolscap envelope necessary) from Medical Officer of Health (Staff Division 3a(i)), County Hall, S.E.1, returnable by 18th July. Canvassing disqualifies. Further inquiries should be addressed to Medical Superintendent at the Hospitals.

The Western Dispensary, 38, Rochester-row, Westminster, S.W.1.

Applications are invited to fill a vacancy on the ATTENDING MEDICAL STAFF of the above Institution.

Applications, with testimonials, must be sent to the Secretary not later than Wednesday, the 11th July.

Applicants to be registered general practitioners, resident in Westminster or Pimlico, and in medical practice.

Connaught Hospital, Walthamstow, E.17. (116 Beds, with Four Resident Medical Officers).

HOUSE PHYSICIAN (Male) required. Salary £100 per annum. Appointment for six months, from 1st August, with board, residence, and laundry. Applications, stating age, nationality, qualifications, and experience, accompanied by copies of not more than three recent testimonials, should be received on or before Friday, 13th July.

KENELM S. ELLISON, Secretary.

Connaught Hospital, Walthamstow, E.17. (116 Beds, with Four Resident Medical Officers.)

HOUSE SURGEON (Male) required. Salary £100 per annum. Appointment for six months, with board, residence, and laundry. Applications, stating age, nationality, qualifications, and experience, accompanied by copies of not more than three recent testimonials, should be received on or before Tuesday, July 10th. KENELM S. ELLISON, Secretary.

Miller General Hospital, Greenwich-road, S.E.10.

CASUALTY OFFICER (Male and unmarried) required. There are six Resident Officers. Salary £150 per annum, with board, residence, and laundry. The appointment is for six months. Applications, stating age, nationality, qualifications, and experience, accompanied by copies of not more than three recent testimonials, to be sent to the Secretary as soon as possible.

3rd July, 1934.

Llanelly and District Hospital.

APPOINTMENT OF HOUSE SURGEON.

Applicants are invited for the post of House Surgeon, who must have both Medical and Surgical qualifications.

The appointment is at the rate of £150 per annum, with board, residence, and laundry.

Preference given to applicant with special experience in Anæsthetics.

Applications, stating age, qualifications, and nationality, with copies of three recent testimonials, to be sent to the undersigned not later than 11th July, 1934.

G. WILLIAMS, Secretary.

22, Stepney-street, Llanelly.

Huddersfield Royal Infirmary. (240 Beds.)

Male HOUSE SURGEON required to commence duty about 9th July, 1934.

Salary £150 per annum, with board, residence, and laundry. Appointment for six months, subject to renewal at the discretion of the Board of Management.

The Hospital is officially recognised for the surgical practice required of non-members before admission to the Final Fellowship Examination of the Royal College of Surgeons of England.

Application, with copies of three recent testimonials, to be addressed to the undersigned immediately.

H. E. G. HALL, General Superintendent and Secretary.

The General Hospital, Birmingham.

Applications are invited for the post of VISITING GYNÆCOLOGICAL REGISTRAR. Candidates must have obtained their Fellowship and be Members of the British College of Obstetrics and Gynæcology or obtain these qualifications within one year of appointment.

Duties will include teaching in the Wards and attendance in the Theatre and Out-patient Department.

The successful candidate will be eligible to apply for the post of Obstetric and Gynæcological Tutor at the University.

Honorarium £50 per annum.

Applications should reach the undersigned as soon as possible, from whom further particulars can be obtained.

A. H. LEANEY, House Governor.

July 2nd, 1934.

The Gloucestershire Royal Infirmary AND EYE INSTITUTION, GLOUCESTER. (218 Beds.)

(FOUR R.M.O.'s).

Applications are invited for the following appointments on the Resident Medical Staff (Male and unmarried):—

HOUSE PHYSICIAN, salary at the rate of £150 per annum.

A HOUSE SURGEON, salary at the rate of £150 per annum, with board, residence, and laundry.

The appointments are for six months, which may be extended for similar periods by re-election from time to time.

Applications for these posts, stating age, qualifications, and nationality, with copies of not less than three recent testimonials, must be received by the undersigned not later than first post on Wednesday, July 11th. The appointed candidates will be required to enter upon their duties at once.

June 25th, 1934. F. J. SYMONS, Secretary.

Liverpool Stanley Hospital
Stanley-road, LIVERPOOL.

There will be vacancies on October 1st next for One HOUSE PHYSICIAN (Male), Two HOUSE SURGEONS (Male), and One HOUSE GYNÆCOLOGICAL SURGEON (Female). Salary in each case at rate of £100 per annum, with board, laundry &c. Candidates must be on the Medical Registrar, and submit their applications, with copies of three recent testimonials, to the undersigned by July 20th, 1934.

2nd July, 1934. E. W. OSBORN, Secretary.

Royal Devon and Exeter Hospital,
EXETER. (225 Beds.)

HOUSE PHYSICIAN (Male).

Applications are invited from qualified and registered candidates for the appointment of House Physician at this Hospital, vacant on 1st August next.

The engagement is for six months, but candidates are eligible for subsequent appointments.

Salary at the rate of £150 per annum, with board, residence, and laundry.

Applications, with copies of testimonials, should be sent to the undersigned on or before Tuesday, 17th inst.

2nd July, 1934. S. S. COLE, Secretary and Manager.

County Mental Hospital,
WHITTINGHAM, PRESTON, LANCS.

Male JUNIOR ASSISTANT MEDICAL OFFICER required. Salary £500, rising by annual increments of £25 to £600 per annum. Board, apartments, and washing provided at a charge of £150 per annum. £50 per annum is paid in addition if the successful candidate has a Diploma in Psychological Medicine. Candidates must be unmarried, and duly registered under the Medical Act.

Applications, stating age, which must not exceed 30 years, qualifications, and copies of testimonials, should reach the Medical Superintendent not later than July 19th. The appointment is subject to the provisions of the Asylum Officers' Superannuation Act, 1909.

Wilts County Mental Hospital,
DEVIZES.

The Visiting Committee invite applications for the post of MEDICAL SUPERINTENDENT of this Hospital. The salary will be £900, together with emoluments consisting of partly furnished house, garden, coal, light, washing, &c., valued at £370 per annum. The Medical Superintendent is responsible not only for the treatment of patients but for the general administration of the Hospital. Applications, stating the date when services would be available, and accompanied by not more than three copies of recent testimonials, must be received by the undersigned not later than July 11th. Canvassing is strictly prohibited.

GUY W. JACKSON, Clerk to the Visiting Committee.

Devizes, 21st June, 1934.

Exeter College, Oxford.

STAINES MEDICAL RESEARCH FELLOWSHIP.

The Rector and Fellows of Exeter College propose to elect to a Staines Medical Fellowship in the course of Michaelmas Term, 1934.

The Fellowship is offered for research in Oxford in one of the Medical Sciences, such as Anatomy, Biochemistry, Clinical Science, Pathology, Pharmacology, Physiology.

The Fellowship is tenable for a maximum period of five years and the annual stipend will be £400, together with the usual allowances, and, if necessary, with rooms in College.

The Fellow will be allowed to undertake a limited amount of teaching, subject to the approval of the Governing Body.

A candidate for the Fellowship should send his application, together with birth certificate, a statement of his career, two sets of copies of his published work, and duplicate copies of not more than three testimonials, to the Rector, Exeter College before November 1st, 1934.

Bristol Royal Infirmary.

Applications are invited for the following medical appointments for the six months commencing September 1st, 1934:—

Three HOUSE PHYSICIANS.
Four HOUSE SURGEONS.
One HOUSE SURGEON to the Ear, Nose, and Throat Department.
One HOUSE SURGEON to the Gynæcological and Skin Departments.
One OBSTETRIC HOUSE SURGEON.
One CASUALTY HOUSE SURGEON.
One HOUSE SURGEON to the Ophthalmic Department and to the Junior Assistant Surgeon.

Salaries at the rate of £80 per annum, with board, apartments, and laundry, except in the case of the Casualty House Surgeon, when the salary will be at the rate of £100 per annum, with board, apartments, and laundry.

Candidates, who must be duly qualified, to send in their applications, stating age, together with copies of not more than three testimonials, to the undersigned on or before July 18th, 1934. Application forms may be obtained from the undersigned.

The elected candidates must become members of the Medical Defence Union before taking up their appointment.

ELLIS C. SMITH, F.C.I.S., Secretary and House Governor.

St. Audry's Hospital for Mental
DISEASES, MELTON, SUFFOLK.

LOCUM TENENS ASSISTANT MEDICAL OFFICER (Male) required. Candidates must be under thirty-five years of age, and unmarried. Salary at the rate of 7 guineas per week with board, lodging, laundry, and attendance.

Applications, stating age, qualifications and experience, together with copies of three recent testimonials, should be sent as soon as possible to the Medical Superintendent.

Salford Royal Hospital. (263 Beds.)

Applications are invited from registered (male) candidates for the post of HOUSE PHYSICIAN. Salary £125 per annum, five months' appointment, vacant August 1st.

Forms of application, obtainable from the undersigned, must be delivered on or before July 10th.

By order of the Board.

H. B. SHELSWELL, General Superintendent and Secretary.

June 25th, 1934.

Queen's Hospital, Birmingham.
(Medical School.)

Applications are invited for the post of RESIDENT MEDICAL REGISTRAR vacant about September 1st. Salary £200 per annum with full board, &c. Candidates must send in their applications, together with testimonials and evidence of registration to the undersigned (from whom all further particulars can be obtained) by Saturday, July 21st.

G. HURFORD, House Governor.

June 29th, 1934.

St. Mary's Hospitals, Manchester.

Two HOUSE SURGEONS for the WHITWORTH STREET WEST HOSPITAL (MATERNITY); and one for the WHITWORTH PARK HOSPITAL (GYNÆCOLOGICAL DEPT.), each for a period of six months from the 1st August next. Salaries at the rate of £50 per annum, with board and residence.

Applications, with copies of three testimonials, to be sent to the undersigned on or before the 12th July.

R. RATCLIFFE, Secretary.

Taunton and Somerset Hospital
(104 Beds), TAUNTON.

HOUSE PHYSICIAN (Male) required August 1st. Three residents on Staff. Appointment (three months, with option re-election) approved by University of London for purposes of M.D. Exam. Salary at rate of £100 per annum, with board, residence, laundry, and the retention of certain fees.

Applications, with copies of three recent testimonials, by July 14th, to F. J. J. STACEY, Secretary.

The Royal Hospital, Wolverhampton
(Incorporated under Charter.)

HOUSE SURGEON required for August 1st.

The Hospital contains 300 Beds, includes the usual specia departments, and is recognised by the various Examining Bodies for a part of the requisite attendance on Medical and Surgical Practice.

Candidates must be registered under the Medical Acts, and unmarried.

The appointment is for six months. Salary at the rate of £100 per annum. Board, furnished rooms, and laundry provided. Applications, with copies of testimonials, to be forwarded to the undersigned. W. H. HARPER, House Governor.

Wolverhampton, 2nd July, 1934.

The Royal Hospital, Wolverhampton
(Incorporated under Charter).

HOUSE PHYSICIAN required for 16th July, 1934.

The Hospital contains 300 beds, the usual special departments, and is recognised by the various Examining Bodies for a part of the requisite attendance on Medical and Surgical Practice. Candidates must be registered under the Medical Acts, and unmarried.

The appointment is for six months, with a salary at the rate of £125 per annum, board, furnished rooms, and laundry provided.

Application, with copies of testimonials, to the undersigned

W. H. HARPER, House Governor.

Wolverhampton, June 18th, 1934.

The Royal Hospital, Wolverhampton
(Incorporated under Charter).

HOUSE SURGEON required for Orthopædic and Fracture Department, duties to commence on July 1st, 1934.

The Hospital contains 300 beds, includes the usual special departments, and is recognised by the various Examining Bodies for a part of the requisite attendance on Medical and Surgical Practice.

Candidates must be registered under the Medical Acts, and unmarried.

The appointment is for six months. Salary at the rate of £100 per annum, board, furnished rooms, and laundry provided.

Applications, with copies of testimonials, to be forwarded to the undersigned. W. H. HARPER, House Governor.

Wolverhampton, June 18th, 1934.

The Children's Hospital, Sheffield.
(110 Beds—3 Residents.)

Applications are invited for the post of HOUSE PHYSICIAN, required immediately.

The appointment is for six months. Salary £100 per annum, with board, residence, and laundry. Candidates (Male and unmarried), who must possess registered qualifications, should forward applications, stating age, nationality, &c., together with copies of three recent testimonials, to the undersigned.

T. H. G. GARTLAND, Secretary.

The Children's Hospital, Sheffield.
(110 Beds—3 Residents.)

Applications are invited for the post of HOUSE SURGEON, vacant 1st July.

The appointment is for six months. Salary £100 per annum, with board, residence, and laundry. Candidates (Male and unmarried), who must possess registered qualifications, should forward applications, stating age, nationality, &c., together with copies of three recent testimonials, to the undersigned.

T. H. G. GARTLAND, Secretary.

Birmingham and Midland Eye HOSPITAL.

The Committee of Management invite applications, from duly qualified medical practitioners, for the post of THIRD HOUSE SURGEON to act chiefly as Casualty Officer.

The salary offered is at the rate of £100 per annum (rising to £130 at the expiration of six months' satisfactory service), with board and furnished apartments.

Applications should be addressed to the undersigned, from whom any further information can be obtained.

J. W. PEARCE, General Superintendent.

Church-street, Birmingham, 3.

Ancoats Hospital, Manchester.

HOUSE SURGEON for special departments, viz., Orthopædic and Ear, Nose, and Throat, required to commence duty on 1st August next. Appointment for six months. Salary at the rate of £100 per annum. Applications, stating age, qualifications, previous experience, if any, and full particulars, to be forwarded to the undersigned, together with copies of three recent testimonials, on or before 18th July.

By order of the Board.

HERBERT J. DAFFORNE,
General Superintendent and Secretary.

Ancoats Hospital, Manchester.

SURGICAL REGISTRAR required to assist the Honorary Surgeon in the Out-patient Surgical Clinics on Tuesday and Friday mornings. A small honorarium is paid. Applications are invited from medical practitioners, and should be forwarded to the undersigned on or before Wednesday, 18th July, 1934, together with copies of three recent testimonials.

By order of the Board. HERBERT J. DAFFORNE,
General Superintendent and Secretary.

Grimsby and District Hospital.
(164 Beds.)

Applications are invited for the following appointments:—SENIOR HOUSE SURGEON. JUNIOR HOUSE SURGEON. Remuneration at the rate of £200 and £150 per annum respectively, with board and residence. Candidates must be fully qualified and registered, and previous Hospital appointment experience is desirable. Duties to commence on August 1st. Applications, stating age, qualifications, and enclosing copies of not more than three recent testimonials, to be forwarded at once to the undersigned.

H. B. COATES, Secretary-Superintendent.

The Hospital for Sick Children,
NEWCASTLE-UPON-TYNE.

Applications are invited for the posts of HOUSE PHYSICIAN and HOUSE SURGEON (Male or Female) for six months as from 1st August, 1934. Salary at the rate of £100 per annum, together with board, residence, and laundry. Applications, stating age, and qualifications, together with copies of testimonials, to be sent to the Secretary, Mr. NEIL BRODIE, 18 City-road, Newcastle-upon-Tyne, 1.

The Hospital for Sick Children,
NEWCASTLE-UPON-TYNE.

Applications are invited for the post of RESIDENT SURGICAL OFFICER (Male).

Applicants must be either Fellows of a Royal College of Surgeons or have passed the primary examination for the English Fellowship. The appointment shall be in the first instance for one year as from 1st August, 1934. The successful applicant may be re-appointed for further periods not exceeding two more years. Salary at the rate of £250 per annum, together with board, residence, and laundry. Forms of application and particulars of duties may be obtained from Secretary, Mr. Neil Brodie, 18, City-road, Newcastle, to whom applications, with copies of three recent testimonials, should be sent on or before 7th July.

1st June, 1934.

Harlow Wood Orthopædic Hospital,
Near MANSFIELD, NOTTINGHAMSHIRE.
(125 Beds.)

Applications are invited for the posts of Two HOUSE SURGEONS (Male). The salaries are at the rate of £175 per annum, with board, residence, and laundry. The duties may include attendance at the affiliated out-patient clinics.

The appointment will be for six months from 1st August, and may be renewed for a further six months.

Applications, stating age and experience, with copies of testimonials, should be sent to the Secretary.

Royal National Orthopædic Hospital.

Applications are invited for the post of HOUSE SURGEON (Male, unmarried) at this Hospital's country branch at BROCKLEY HILL, STANMORE, MIDDLESEX (278 Beds; 160 cases of surgical tuberculosis). Salary £150 per annum, with board, quarters, and laundry. The appointment is for six months, renewable for a further period of six months on the recommendation of the Medical Board. Duties to commence August 1st. Applications, with copies of testimonials, should be sent to the Secretary, 234, Great Portland-street, W.1, not later than July 17th.

East Lancashire Tuberculosis Colony,
BARROWMORE HALL, GREAT BARROW, NEAR CHESTER.
Under the direction of the British Red Cross Society and the Order of St. John of Jerusalem.

HOUSE PHYSICIAN (Male) required at end of July. The appointment is for six months and is renewable. Salary £100 per annum, with board, residence, and laundry.

The appointment is terminable by one month's notice.

The Institution deals with all stages of pulmonary tuberculosis and comprises hospital accommodation, sanatorium accommodation, extensive workshops for graduated work, and a settlement.

Applications, marked "House Physician," with copies of three testimonials, to be sent to the Medical Superintendent at the above address.

East Sussex County Council.

SOUTHLANDS HOSPITAL, SHOREHAM-BY-SEA.

ASSISTANT MEDICAL OFFICER.

Applications are invited from fully qualified registered medical practitioners (unmarried) for the post of Temporary Male Assistant Medical Officer (non-resident), at the Southlands Hospital, Shoreham-by-Sea, near Brighton (265 Beds). The appointment is for one year. Salary £350 per annum, with a lodging allowance of £150 per annum. At a later date the Officer may be provided with accommodation in the Hospital; in that case the lodging allowance will be reviewed.

Candidates must have a surgical qualification and have had surgical operative experience.

The successful candidate will be required to pass a medical examination.

Applications should be made on a form obtainable from the County Medical Officer of Health, County Hall, Lewes, and must be returned to him by Saturday, 14th July, 1934, together with copies of three recent testimonials.

H. J. T. MCILVEEN,
County Hall, Lewes. Clerk of the County Council.

ADELAIDE HOSPITAL AND ADELAIDE UNIVERSITY, SOUTH AUSTRALIA.

Applications are invited from qualified medical practitioners for the position of DEPUTY DIRECTOR and BACTERIOLOGIST to the Laboratory at the Adelaide Hospital, who will also be LECTURER in Bacteriology in the University of Adelaide. Salary £940 per annum.

Further particulars can be obtained from the Agent-General for South Australia, Australia House, Strand, London, W.C.2, to whom applications should be sent not later than August 15th. Duties will commence January 1st, 1935.

SOUTHERN RHODESIA MEDICAL SERVICE

GOVERNMENT MEDICAL OFFICER.

Applications are invited from fully qualified male medical practitioners for appointment as Government Medical Officer in the Southern Rhodesia Medical Service.

Salary will be on the scale £600 × 25 — £750 per annum. There is also a senior grade (£750 × 25 — £900) to which promotions are made as vacancies occur. In addition private practice is allowed.

The successful applicant will be required to sign an agreement for three years service in the first instance, and thereafter may make application to be placed on the pensionable establishment.

A free steamship passage to Cape Town and railway ticket thence to Southern Rhodesia will be provided.

Applications, stating age, qualifications, and experience, together with copies of testimonials, should reach the Official Secretary, Office of the High Commissioner for Southern Rhodesia, Crown House, Aldwych, London, W.C.2, not later than the 21st July, 1934.

Further particulars may be obtained from the above address. Canvassing will disqualify.

City Mental Hospital, Nottingham.

Wanted, JUNIOR ASSISTANT MEDICAL OFFICER (Male), single, preferably with some post-graduate General Hospital experience. Salary £350 to £450 per annum, by four £25 increases, all found, with an additional £50 per annum on obtaining the D.P.M. The Hospital has a well equipped Laboratory. Application, with fullest particulars, should be sent to the Medical Superintendent forthwith.

Warneford General Hospital
(156 Beds), LEAMINGTON SPA.

Required, RESIDENT HOUSE SURGEON to CASUALTY and SPECIAL DEPTS. (combined post), to commence duties on 27th July.

Special depts. include Ear, Nose, and Throat, Maternity and V.D. Depts.

Six months appointment. Salary £150 per annum, with board and laundry.

Applications from qualified and registered medical practitioners (single men only), with copies of not more than threes recent testimonials, should be sent to the undersigned on or before 11th July, 1934.

EDWARD L. WITHOMAN, House Governor and Secretary.

Manchester Royal Infirmary.

ASSISTANT MEDICAL OFFICER to the DERMATOLOGICAL DEPARTMENT.

The Board of Management of the Manchester Royal Infirmary invite applications for the above appointment, which will become vacant on 1st August, 1934.

Applicants must be registered and hold a medical and surgical qualification.

The appointment (non-resident) is for twelve months renewable for two further periods of one year, subject to the provisions of the Bye-laws as to notice.

Attendance is required on Tuesday mornings from 9 o'clock to 12 noon.

Salary at the rate of £35 per annum.

Applicants must state age, and address twelve copies of their application and testimonials to the undersigned by 18th July, 1934. By order.

R. TINDALE, For General Superintendent and Secretary.

27th June, 1934.

Royal Salop Infirmary, Shrewsbury.
(150 Beds.)

APPOINTMENT OF CASUALTY OFFICER AND RESIDENT ANÆSTHETIST.

Applications are invited from fully qualified men for the appointment of Casualty Officer and Resident Anæsthetist vacant immediately. Salary £160 per annum, with board, residence, &c.

The appointment is for six months in the first instance, subject to reappointment for a further period of six months. Resident staff comprise Resident Surgical Officer, House Physician, and Casualty Officer and Resident Anæsthetist.

Applications, stating age, qualifications, experience, nationality, and accompanied by copies of three recent testimonials, to be sent to the undersigned forthwith.

J. W. NOBLE, Secretary-Superintendent.

Board Room, June 30th, 1934.

Royal Eastern Counties' Institution
FOR THE MENTALLY DEFECTIVE.

MEDICAL SUPERINTENDENT required for a Branch of the Royal Institution situated at BRIDGE HOME, WITHAM, ESSEX (370 male beds.) The Superintendent appointed will be in administrative and medical charge of the Home at Witham, subject to the authority of the Medical Superintendent of the whole group of Institutions and Branches which form the Royal Institution.

The appointment is a whole-time one. Previous residential experience in a mental deficiency institution or in a mental hospital, is essential. Age not over forty. Applications to be received not later than 12th July. Commencing salary £600 a year, with unfurnished house (free of rates), and garden produce. The house is not yet built. While it is being erected an allowance will be made in lieu of it.

Apply, giving age, experience, and copies of references, to Medical Superintendent, Royal Institution, Colchester.

Hampshire County Council.

ASSISTANT COUNTY MEDICAL OFFICER.

Applications are invited for the post of Assistant County Medical Officer. Possession of a Diploma or Degree in Public Health is essential and preference will be given to candidates with special experience in up-to-date methods of diagnosing and treating tuberculosis. Experience in other departments of public health work including the treatment of venereal diseases, medical inspection of school children, and maternity and child welfare will be considered an advantage.

Salary £600 a year rising by increments to £750 (subject to deductions under the Local Government and Other Officers' Superannuation Act, 1922) in addition to travelling expenses.

Applications, with copies of not more than three recent testimonials, upon a form which, with the conditions of appointment, may be obtained from the County Medical Officer, The Castle, Winchester, should be sent to him as soon as possible and not later than the 14th July, 1934. Canvassing is prohibited.

Royal Berkshire Hospital, Reading.

RESIDENT ANÆSTHETIST (Male) required immediately. The candidates must be fully qualified and registered.

Remuneration at the rate of £150 per annum, with board, residence, and laundry.

Applications, with copies of testimonials, to be sent to the undersigned immediately.

F. A. LYON, Secretary.

Chesterfield and North Derbyshire
ROYAL HOSPITAL. (220 Surgical and Medical Beds.)

HOUSE SURGEON.

Applications are invited from fully qualified men for the above post. There are five residents.

The appointment is for six months. Salary at the rate of £150 per annum, with board, apartments, and laundry.

Applications, stating age, together with copies of three recent testimonials, should be sent to the undersigned as soon as possible.

G. SUNNUCK, Superintendent and Secretary.

26th June, 1934.

Addenbrooke's Hospital, Cambridge.

Applications are invited for the post of HOUSE SURGEON. The appointment will be for six months from August 1st, 1934, but is terminable at an earlier date by one month's written notice on either side. Salary at the rate of £130 per annum, with board, residence, and laundry. Candidates (male) who must be unmarried and duly registered, are requested to forward their applications, stating age, qualifications, &c., together with copies of not more than four testimonials, to the undersigned on or before Saturday, July 14th, 1934.

W. H. HEAD, Secretary-Superintendent.

Addenbrooke's Hospital, Cambridge.

Applications are invited for the post of RESIDENT ANÆSTHETIST AND EMERGENCY OFFICER (Male). The appointment will be for three months from August 1st, 1934. Salary at the rate of £130 per annum, with board, residence, and laundry. Candidates, who must be unmarried and duly registered, are requested to forward their applications, stating age, qualifications, &c., together with copies of not more than four recent testimonials, to the undersigned on or before Saturday, July 14th, 1934.

W. H. HEAD, Secretary-Superintendent.

Lancashire County Council.

BIDDULPH GRANGE ORTHOPÆDIC HOSPITAL.

Applications are invited from duly qualified and registered medical practitioners for the following posts at the above Hospital, which contains 88 beds:—

SENIOR HOUSE SURGEON.

Salary £250 per annum, together with board, residence, and laundry. Candidates must have had experience in a general hospital. Preference will be given to candidates who have had orthopædic experience.

JUNIOR HOUSE SURGEON.

Salary £150 per annum, together with board, residence, and laundry. Preference will be given to candidates who have held resident hospital appointments, and who are competent anæsthetists.

Both appointments will be for a period of six months in the first instance, and for a further six months at the option of the Council, but will not be renewable after that time.

Applications, with copies of two recent testimonials, should be sent not later than the 21st July, 1934, to Dr. J. J. Butterworth, School Medical and Child Welfare Department, County Offices, Preston.

Duties to commence 1st September, 1934.

GEORGE ETHERTON, Clerk of the County Council.

County Offices, Preston, 27th June, 1934.

County Borough of Birkenhead.

DEPARTMENT OF THE MEDICAL OFFICER OF HEALTH.

ASSISTANT MEDICAL OFFICER (RESIDENT)

Applications are invited for the above appointment from duly qualified men (unmarried) holding a Diploma in Public Health, who have had special experience in hospitals for infectious diseases.

The appointment carries with it a salary of £350 per annum, rising by annual increments of £25 to a maximum of £550 per annum, with emoluments (residence at the Infectious Diseases Hospital, board, and laundry), valued at £150 per annum.

The successful candidate will be required to pass a medical examination, and a deduction of 5 per cent. will be made from salary towards the Council's scheme under the Local Government and Other Officers Superannuation Act, 1922.

Canvassing members of the Town Council, either directly or indirectly, will disqualify.

Particulars of the appointment, and form of application, may be obtained from D. Morley Mathieson, Esq., M.A., M.D., Medical Officer of Health, 9, Hamilton-square, Birkenhead.

Applications must be received by me not later than Monday, 9th July, 1934, endorsed "Assistant Medical Officer."

E. W. TAME, Town Clerk.

Town Hall, Birkenhead.

City of Norwich.

ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER.

Applications are invited for the post of Assistant Medical Officer of Health and Assistant School Medical Officer. Salary £500 per annum, rising by annual increments of £25 to £700 per annum. For particulars send stamped addressed envelope to the Medical Officer of Health, 68, St. Giles-street, Norwich.

Norfolk & Norwich Hospital, Norwich.

(392 Beds.)

Applications are invited for the post of HOUSE SURGEON to the Special Departments (Ear, Nose, and Throat, and Ophthalmic). Salary £120 per annum, with board, residence, and laundry. Candidates (Male), who must possess registered qualifications, should forward applications, stating age, nationality, &c., together with copies of testimonials, to the undersigned as soon as possible.

FRANK INCH, House Governor and Secretary.

6th July, 1934.

West Kent General Hospital,

MAIDSTONE. (120 Beds.)

Applications are invited for the posts of:—
HOUSE PHYSICIAN.
HOUSE SURGEON.
who must be males of British nationality.

Salary at the rate of £150 per annum, with board, apartments, and laundry.

Candidates must possess registered qualifications.

Applications, stating qualifications and experience, together with copies of testimonials, should be sent to the undersigned on or before the 14th July next.

E. J. GREGG, House Governor and Secretary.

Southend-on-Sea General Hospital.

(235 Beds. Six Residents.)
Specialist Staff of 17 Members.

Applications are invited for the post of RESIDENT OBSTETRIC and GYNÆCOLOGICAL OFFICER. This Officer will have charge of 24 Beds, and previous resident obstetric experience is essential. Salary at the rate of £125 per annum, with board, residence, and laundry. The appointment will commence at once and will continue until 1st of March next. Candidates must be registered (male) practitioners.

Application forms are available and must be returned with three copies of recent testimonials as soon as possible.

C. G. PEARSON } Joint
P. H. CONSTABLE } Secretaries.

Hull Royal Infirmary.

(367 Beds.)

Applications are invited from registered medical practitioners for the following posts (Male), vacant now:—
CASUALTY OFFICER.
THIRD HOUSE SURGEON.

Salary for each post at the rate of £150 per annum, plus residence, board, and laundry.

Both appointments will be for six months but will at any time be determinable by one month's notice on either side.

The Casualty Officer will work mainly under the direction of the Resident Surgical Officer.

The Hospital is recognised by the Royal Colleges for the F.R.C.S. Examinations.

The holders of both the posts now advertised will be eligible for promotion to more senior posts when vacancies occur.

Applications, giving particulars of age, experience, and nationality, together with copies of recent testimonials, should be addressed to the undersigned.

July 2nd, 1934. R. J. CARLESS, House Governor.

City of Cardiff.

ISOLATION AND SMALL-POX HOSPITALS.

RESIDENT MEDICAL SUPERINTENDENT (Male).

Applications are invited for the post of Resident Medical Superintendent of the Cardiff Isolation and Small-pox Hospitals (208 Beds altogether). The average daily number of occupied beds during recent years has been about 160.

Candidates must be under fifty years, must have had extensive experience of infectious diseases and, in addition, hold a Diploma or Degree in Public Health.

The salary will be £720 per annum, rising by four biennial increments of £50 and one of £12 10s. to £932 10s. per annum (subject to a temporary reduction of 3 per cent.) with, in addition, free house, fuel, and light (valued at £130 per annum).

The person appointed will be required to pass a medical examination and to contribute 5 per cent. of his salary and the value of his emoluments to the Superannuation Fund of the Council.

Applications must be made on the prescribed form, copies of which, with further information regarding the appointment, may be obtained from the undersigned, by whom applications, accompanied by copies of three recent testimonials, and endorsed "Medical Superintendent," must be received not later than 9 A.M. on 14th July, 1934.

J. GREENWOOD WILSON, Medical Officer of Health.

Public Health Department, City Hall, Cardiff.
25th June, 1934.

58

Westmorland Sanatorium, near

GRANGE-OVER-SANDS. (150 Beds.)

Applications are invited for the post of HOUSE PHYSICIAN at this Sanatorium. Salary £250 per annum, with board, lodging, and laundry. The appointment will be for a period of six months. Applications, with copies of recent testimonials, to be sent to The Medical Superintendent, before the 13th July.

Royal South Hants and Southampton

HOSPITAL. (275 Beds.)

Applications are invited for the appointment of CASUALTY OFFICER for a period of six months ending 31st December, 1934, at a salary of £150 per annum, with board, lodging, and laundry. Candidates must be male and unmarried. Applications, accompanied by not more than three testimonials, should be sent to the undersigned at once. HY. TRUSSON, Secretary.

Chester Royal Infirmary.

(211 Beds.)

Two HOUSE SURGEONS (Male) required for 1st August. Salary £150 per annum with board, lodging, and washing. Application list closes 20th July. Application forms may be obtained from W. H. GRACE, M.D., M.R.C.P., Hon. Superintendent of Resident Medical Staff.

St. Mary's Hospitals, Manchester.

ASSISTANT MEDICAL OFFICER (non-resident) for the Children's Out-patients' Department for a period of six months from the 1st September next. Salary at the rate of £150 per annum.

Applications, with copies of three testimonials, to be sent to the undersigned on or before the 17th instant.

R. RATCLIFFE, Secretary.

Bristol Royal Infirmary.

Applications are invited for the post of HONORARY OBSTETRICIAN. Candidates, who must be Masters of Surgery of one of the Universities of Great Britain or Ireland, or Fellows of the Royal College of Surgeons of England, Edinburgh or Ireland, or Graduates in Medicine in one of the Universities of Great Britain or Ireland, who hold in addition a special degree or diploma in Obstetrics of one of the Universities of Great Britain or Ireland, or of the Royal College of Surgeons of England, Edinburgh or Ireland, to send in their applications, stating age, together with not more than three testimonials, to the undersigned on or before July 21st, 1934.

ELLIS C. SMITH, F.C.I.S., Secretary and House Governor.

Bristol Royal Infirmary.

Applications are invited for the post of HONORARY ASSISTANT ANÆSTHETIST. Candidates, who must be Doctors of Medicine or Graduates of one of the Universities of Great Britain or Ireland, or Fellows, Members, or Licentiates of the Royal College of Physicians of London, Edinburgh or Ireland, to send in their applications, stating age, together with not more than three testimonials, to the undersigned on or before July 21st, 1934.

ELLIS C. SMITH, F.C.I.S., Secretary and House Governor.

Bristol Royal Infirmary.

Applications are invited for the post of MEDICAL REGISTRAR. Candidates who must be Doctors of Medicine or Graduates of one of the Universities of Great Britain or Ireland, or Fellows, Members, or Licentiates of the Royal College of Physicians of London, Edinburgh or Ireland, to send in their applications, stating age, together with not more than three testimonials to the undersigned on or before July 21st, 1934.

ELLIS C. SMITH, F.C.I.S., Secretary and House Governor.

Royal United Hospital, Bath.

HOUSE SURGEON required at once. Duties include general Surgical and Ear, Nose, and Throat work.

Salary £150 per annum, board, residence, and laundry.

The appointment is for six months, and candidates must be Male, unmarried, and of British nationality.

Applications, with copies of three testimonials, to be addressed to the undersigned immediately.

J. LAWRENCE MEARS, Secretary-Superintendent.

5th June, 1934.

Royal United Hospital, Bath.

OUT-PATIENT AND CASUALTY OFFICER required at once.

The appointment offers opportunity of experience in Medicine and Surgery.

Salary £150 per annum, with board, residence, and laundry.

Appointment for six months, and candidates must be Male, unmarried, and of British nationality.

Applications, with copies of three testimonials, to be addressed to the undersigned immediately. J. LAWRENCE MEARS,
5th June, 1934. Secretary-Superintendent.

Resident Medical Officer Wanted at FRENCHAY PARK CHILDREN'S ORTHOPÆDIC HOSPITAL AND SANATORIUM, Bristol (100 beds.) Appointment for twelve months. Candidates must be experienced in Anæsthetic work. Duties will include Anæsthetic work at other Institutions of the Corporation. Salary £250 per annum. Applications to be made to the Medical Officer of Health, 40, Prince-street, Bristol, by the 19th July, 1934.

Manchester Royal Eye Hospital. Vacancy now occurs for JUNIOR HOUSE SURGEON. Salary £120 per annum, with residence, board, &c. Applications (with copies of testimonials), endorsed "House Surgeon," to be addressed to the Chairman of the Board of Management.

H. R. NORTH, General Superintendent and Secretary.

Royal Devon and Exeter Hospital, EXETER.

APPOINTMENT OF HOUSE SURGEON TO THE EAR, NOSE, AND THROAT DEPARTMENT (MALE).

Applications are invited from qualified and registered candidates for the above appointment, vacant on July 27th.

The engagement is for six months, but candidates are eligible for subsequent appointments.

Salary at the rate of £150 per annum, with board, residence, and laundry.

Applications, with copies of testimonials, should be sent to the undersigned on or before Monday, 16th July, 1934.

S. S. COLE, Secretary and Manager.

APPOINTMENT OF MEDICAL OFFICER OF HEALTH FOR THE COMBINED DISTRICTS OF EAST GRINSTEAD URBAN AND UCKFIELD RURAL.

Applications are invited by the Councils of the above Districts (area 118,896 acres, population 47,500) for the appointment of Medical Officer of Health, part of whose duties will be the Medical Superintendence of an Infectious Diseases Hospital. In addition to his duties as Medical Officer of Health he will be required to act as Assistant School Medical Officer under the direction of the County Medical Officer of Health. Applicants must possess a Diploma in Public Health, and preference will be given to candidates who have had previous experience of public health administration, and practical experience of the treatment of infectious diseases.

Salary £800 per annum, with travelling expenses, office accommodation, and clerical assistance.

The appointment will be subject to the approval of the Ministry of Health and of the Board of Education, and to the provisions of the Local Government and Other Officers' Superannuation Act, 1922.

Applicants must not be over forty years of age, and the officer appointed will be required to reside in the area at a place to be approved by the combined authorities.

Applications on a prescribed form, obtainable from the undersigned, should be addressed to me, with copies of not more than three testimonials, and delivered at the offices of the Uckfield Rural District Council, Starfield, Beacon-road, Crowborough, Sussex, not later than first post on Monday, the 23rd day of July, 1934.

Dated this 6th day of July, 1934.

FRANK FITCH,
Clerk to the Uckfield Rural District Council.

LOCUMS URGENTLY REQUIRED.

Griffiths' Medical Agency, Tredegar Chambers, Newport, Mon.

Wanted. Outdoor Assistant to live at Surgery. Fire and Light provided. Salary £350 per annum. Usual bond.—Address, No. 1000, THE LANCET Office, 7, Adam-street, Adelphi, W.C.2.

Out-door Assistant, with ultimate view, London, West. Salary £300 and excellent house, with garage.—Address No. 1005, THE LANCET Office, 7 Adam-street, Adelphi, W.C.2.

The Royal Army Medical Corps ASSOCIATION, 85, Eccleston-square, S.W.1 (Telephone: Victoria 2722), supplies qualified Dispensers, Book-keepers, Laboratory Assistants, Sanitary Assistants, Male Nurses, Mental and Special Treatment Orderlies, Dental Clerk Orderlies, Porters, Caretakers, &c., without charge to prospective employers.

Pathological and Bacteriological LABORATORY ASSISTANTS' ASSOCIATION.—Pathologists and Bacteriologists requiring Skilled Certified LABORATORY ASSISTANTS are invited to communicate with H. GOODING, Hon. Secretary, "Moolire," 10, Holbeck-grove Victoria Park, Manchester. No fees.

Well Educated Woman Desires Work with a London Doctor, now or in the autumn. Experienced, qualified Dispenser, good Secretary-typist, book-keeper, &c. Excellent references.—Address, No. 1001, THE LANCET Office, 7, Adam-street, Adelphi, W.C.2.

Several small Practices at very low premiums. Excellent opportunities for anyone with small capital wishing to get settled in practice. Scope in every case.—Apply, Peacock & Hadley, Ltd., 19, Craven-street, Strand, W.C.2.

For Immediate Sale.—Large Ophthal- MIC PRACTICE in Industrial part of Midlands. Consulting rooms available, whole House might be considered. Write stating qualifications, to No. 1002, THE LANCET Office, 7, Adam-street, Adelphi, W.C.2.

Lincs. Coast Town.—Old-established PRACTICE. Receipts about £1500 per annum, including good panel. Nice house, garage, &c., rent £100. Premium £1500. Vendor retiring.—Apply, Peacock & Hadley, Ltd., 19, Craven-street, Strand, W.C.2.

Good Nucleus for Practice.—For Sale or Let on lease. Exceptional opportunity for medical man to acquire an exceptionally well-built Bungalow in a rapidly rising district within 15 miles of London, containing 4 bedrooms, 3 reception rooms, and usual offices. Electric light, gas, and central heating throughout. Large garden, completely stocked. Conservatory. Garage, sheds, &c. No opposition within half a mile, ample scope.—Further particulars from No. 1003, THE LANCET Office, 7, Adam-street, Adelphi, W.C.2.

Resident Patients.—Doctors desiring accommodation for private patients (mental, neurasthenic, invalid, &c.) may have, post free, illustrated BOOKLET describing residences, &c., of numerous colleagues in all parts—town, country, and seaside—who receive such patients.—Apply, General Manager, British Medical Bureau, 12, Stratford-place, Oxford-street, W.1.

Birmingham (Yardley).—£825, newly erected detached corner RESIDENCE in thickly-populated neighbourhood, main 'bus route, providing excellent opportunity for Doctor, 4 bedrooms, bathroom, separate W.C. Garage, ample space for Surgery.—Full particulars, apply, Haylock & Inchley, Auctioneers, 3 Newhall-street, Birmingham, 3

TO LET.

SUITABLE DOCTOR OR DENTIST.
HOLDERS HILL ROAD (facing the Golf Links), HENDON

Attractive Modern Residence con- taining 4 Bedrooms, 2 very large Reception-rooms, kitchen and scullery, &c., and Lounge. Large garden and garage. GROWING NEIGHBOURHOOD. Rent £115 per annum, exclusive, on Agreement or Lease.

Apply, PRITCHARD, Builders, 12, Holders Hill-road, Hendon, N.W.4. 'Phone: Finchley 4946. (Open week-ends.)

Corner House, New, in centre of rapidly growing district (Welling), £745.—Address, No. 1004, THE LANCET Office, 7, Adam-street, Adelphi, W.C.2.

To Let: large, light, well-furnished LOUNGE for Doctor to receive Patients in Private Mansion Flat.—'Phone before 2 p.m. Holborn 6220, 21, Russell square Mansions, Southampton-row, W.C.1.

WELBECK STREET.

Consulting Room for Radiologist, completely equipped with modern apparatus, available at once, to be LET, moderate rent.—Address, No. 999, THE LANCET Office, 7, Adam-street, Adelphi, W.C.2.

Bournemouth's Harley Street. CONSULTING ROOMS to Let in house designed for such. Unequalled position. Large room, with running water, electricity, gas. Waiting room, door attendance. Rent £100 (approx.).—Apply, Riddett & Ede, The Square, Bournemouth.

Consulting Rooms to Let, Harley- street and district, whole or part-time. Lists sent on application.—Elgood & Co., 10, Henrietta-street, Cavendish-square, W.1. Tel.: Langham 2601.

ESTABLISHED 1860

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(H. E. Allpress, H. C. Rowe),

6, VERE STREET, CAVENDISH SQUARE, W.1.

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2. NORTH LONDON.—PARTNERSHIP.—A one-third Share producing about £1000 p.a. (with increase later as agreed) is offered in an old-estab. good mixed-class Practice, averaging just over £3000 p.a. Panel of over 1200, and appointments worth about £175. Visits 3s. 6d. to 10s. 6d. Midwifery from 3 gns. Suitable house can be obtained. Ingoing partner must be experienced, interested in medicine, and preferably Scottish or English. Premium for share 2 years' purchase.
3. BIRMINGHAM.—Old-estab. chiefly better-class PRACTICE held by Vendor (who is retiring) for the past 13 years. Gross cash receipts for the past 12 months £1022. Selected panel of 108. Fees, a few at 3s. 6d., chiefly 5s. upwards. Low expenses. Suitable house with 2 reception, 6 bedrooms, &c., good professional accommodation. Electric light. Small garden. Rent £75 p.a. Very good scope for increase as area is extending. Premium 1½ years' purchase.
4. SURREY.—RESIDENTIAL DISTRICT.—Rapidly increasing good mixed-class PRACTICE, producing for last 12 months £400. Panel of 200. Fees 2s. 6d. to 10s. 6d. Very nice modern house with all conveniences, containing 2 reception, 4 bedrooms, &c. Electric light and garden. Price for freehold £2000, part on mortgage. District is being largely developed, and it is stated there is excellent scope for increase. Premium £500.
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8. SURREY.—WITHIN EASY REACH OF LONDON.—Recently estab. PRACTICE offering good scope for increase. Receipts for immediate past 12 months £424. Panel of 180. Fees 1s. 6d. to 5s. Low expenses. Small house with 2 reception, 3 bedrooms, &c. Rent £84 p.a. Premium £450.
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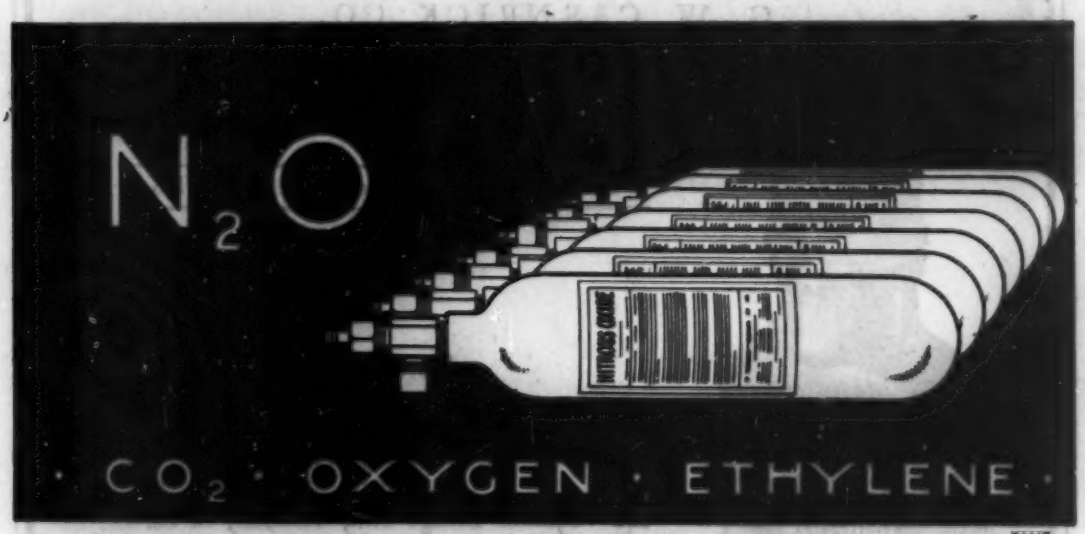

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